GARDEN CITIES
IN
THEORY AND PRACTICE

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GARDEN CITIES IN THEORY AND PRACTICE

GARDEN CITIES IN THEORY AND PRACTICE

BEING AN AMPLIFICATION OF A PAPER ON

THE POTENTIALITIES OF APPLIED SCIENCE IN A GARDEN CITY

READ BEFORE SECTION F OF THE BRITISH ASSOCIATION

BY

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VOLUME II.

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'Great inventions are never, and fresh discoveries are seldom, the work of any one mind.'

'Those who aim vigorously at perfection will come nearer to it than those whose laziness or despondency makes them to give up its pursuit from the feeling of its being unattainable.'—CHESTERFIELD.

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Frontispiece to Vol. II.

'Here reigns Content,
And Nature's child Simplicity, long since
Exil'd from polish'd realms. Here ancient modes
And ancient manners sway; the honest tongue
The heart's true meaning speaks, nor masks with guile
A double purpose; industry supplies
The little Temp'rance asks, and rosy health
Sits at the frugal board.'

Garden Cities

CHAPTER V

THE SOCIOLOGICAL ASPECT

'When shall all men's good be each man's rule, and universal Peace
Lie like a shaft of light across the land?'—TENNYSON.

'God builds His temple in the heart on the ruins of character and religions.'—EMERSON.

VOLUMES might be written concerning the sociological effect of the establishment of new communities, wherein reforms, precautions, safeguards, antidotes, and the like, should be introduced in order to counteract and exorcise the evils inherent to huge existing communities of anarchic growth. But when such had been written, in all probability, little good would have been done, for at best such matter could be but anticipatory and speculative. If the question were asked, 'In what manner would the inhabitants of Garden Cities disresemble and their conduct differentiate from the inhabitants of cities as normally constituted?' the safest, and probably the most correct, reply would be that at

first they would differ in but small degree. Reflection, however, will at once show that the sociological value of the innovation would lie in its *power to achieve* that which is well-nigh impossible in unwieldy and promiscuously grown communities; that, moreover, such power could be made very real and effective.

It is noticeable, in regard to socialistic pioneers and active well-wishers of social reform, that they almost invariably fall, at the outset, into a dual error. Firstly, they become ardent advocates for a *too drastic* and *too selective* and *individualistic* reform; secondly, they, in a large measure, fail to acquaint themselves with, and to adequately understand the nature of, the material they set themselves to work upon. What *should* be done is invariably neglected. Instead of striving, with an ardour worthy of a better cause, to initiate and to establish a state of things appealing to *a class or sect*, the point to be striven for is the formulation and introduction of reform such as would appeal to existing communities—such, moreover, as would bear upon it the imprint of *universal acceptance*. In the latter case the battle would be almost wholly won by conciliation of the enemy, whilst the victory would be of universal instead of individual interest, and unmarred by the ridicule of the more normal-minded. One has only to reflect upon what has been accomplished by such reformers and leaders of sects to see that their achievements—albeit deemed by their

authors successes—have, by universal consent, been failures, their ultra-radical reformatory accomplishments being held up to ridicule.

The second error is the misconception of the nature of the classes they propose to reform, and the attribution to them alike of merits and desires not possessed by them, and quite foreign to their tastes and wishes. The business of reform differs not from the business of every-day life in the necessity for thoroughly understanding one's material. The successful manufacturer examines with minuteness both the meritorious attributes and the defects and shortcomings of the raw material upon which the change—constituting his business—has to be wrought. His object is to assure himself that the treatment during transformation is not only suitable, but such as the specific material will be amenable to and take to kindly. So should it be with the reformation and transformation of human raw material.

The treatment prescribed is usually at fault in two ways. Firstly, it presupposes the possession of meritorious attributes in the classes which, in fact, they do not possess; and then, with strange inconsistency, it prescribes a course of *pampering* such as would be highly objectionable to, and indeed resented by, such classes if they really possessed the qualities attributed to them. Your conscientious worker asks not for, nor will he brook, pampering processes; he asks only for opportunity, a fair field, and no favour. If the bill of the posing

worker be agape for the pampering sop and the morsels of charity, we may rest assured we have *not* secured the proper *raw material* to work upon.

The greatest danger to the plans of such reformers, however, lies in their inability to comprehend the inviolable laws of Nature, and to apply them to her human units. The merest questioning of Nature teaches us that typically characteristic of her are the universal dependence of one unit upon another, and a vast discrepancy in functional importance—the absence of equality—in such units. This law, it is well-known, applies equally to things of greatest magnitude as to things of microscopic mass. The great worlds circumgyrating in that portion of the incomprehensibly vast universe explored by us are, as we well know, all amenable to the influence of still greater ones. Great worlds wing their transcendental flight in paths and orbits dictated to them by others of more potent command; in attendance upon these are satellites, entirely subservient to the lesser powerful; yet, in their turn, the subservient command the courses and destiny of myriads of moving masses, every component unit of which performs its appointed task in accord with inviolable law and under the benign and direct control of the proportionately more powerful, endued with command derived from a still higher source. Thus we know the asteroidal worlds to be influenced, constrained, controlled; their paths ordered and their lives governed by the more potently functioning. Turn we to the other extreme, we know that,

inorganically, the impotent atom is marshalled into the ranks of the effectively acting molecule by commanding influences; organically, that the all-pervading bacillus or microbe is devastated or propagated, as the case may be, becomes disease-spreading or beneficently useful, through the force of superiority in its own species. In higher animate nature, disproportion in *muscular* sway has wrought out beneficent evolution through that all-pervading law—the survival of the fittest. Lastly, it requires no great acumen in the student of human nature to perceive that with us, by the same law, things are ordered by differentiation in the puissance of *mental* sway.

The abolition of feudalism and serfdom in this and other countries, the increase in importance and political power of the lower orders, the vast extension of industries in all countries, affording useful employment for mental effort in workers of every grade, and lastly, but of great importance, the growing interdependence of the human units of all ranks, confers upon sociology an importance calling for its serious and scientific study. Hence it is with a feeling of great satisfaction one views the trend of thought in this direction and the establishment of Bureaux and Societies for the systematic study of an important subject, one that ere long should become a branch of science.*

* Of these might be mentioned, in the order of their inception, the American Institute of Social Service, Dr. W. H. Tolman,

Want of appreciation of the universal applicability of the great law referred to is the factor most likely to wreck all well-meant effort; I have felt constrained, therefore, to direct the reader's attention to it—though ever present in the mind of the physicist—for neglect to regulate ourselves in accordance with natural law is as the application of a drag to enlightenment and progress. I mention it, moreover, for no sooner had a plot of land been acquired for the building of the 'First Garden City' than the fatal neglect and misconception manifested itself in the cry 'Equality.' In efforts directed towards the amelioration of disabilities, suffering, and degradation—efforts involving national welfare—it were cowardly to mince words; therefore let the reader be at once reminded that this outcry for 'equality' has proved the curse of industrial England. The doctrine involves the absurd assumption, to which I have adverted in the introduction, that the loungers — the quasi-inert and industrially passive atoms—are of equal reproductive and national value with the active workers or energy-imparting units.

The first element of successful reform and amelioration of existing disabilities, and hence the first evidence of the value of the innovation, will accrue

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Director, 287, Fourth Avenue, New York, U.S.A.; the Musée Sociale, Georges Benoit-Levy, 25, Avenue de la République, Paris; and the Sociological Society, Victor V. Branford, Hon. Secretary, 5, Old Queen Street, London, S.W.

from the correct choice of the plant to be nurtured —the careful selection of the raw material to be worked upon—and the appropriate culture and treatment of that which is to form the basis of industrial reproduction and future national prosperity.

Having chosen the plants, the points to be striven for are their healthy growth in appreciated environment and the successful evolution of the species into units, of greater or lesser reproductive importance, well constituted and appropriately equipped to fight the battle for happy existence. Let us deal with the first—the primary object for which 'Garden Cities' have been suggested, wherein everything would appear so conducive to it.

Health, from the social point of view, is principally bound up with individual happiness, but it must not be forgotten that it possesses vast mercantile and national value. It has been calculated that nearly one and three-quarter millions of people ($1\frac{3}{5}$) are always on the sick-list in this country, and that some twenty-seven millions of cases of illness occur annually. Of these it has been estimated, at the lowest, that nearly eight and a half millions ($8\frac{2}{5}$) of cases might be prevented if the laws of health were properly attended to. Taking each case to involve a loss of ten days' work, we have eighty-four million days' work absolutely lost which otherwise might have been utilized. If half the number of cases be taken to be those of adults earning three

shillings per day, the national loss in work and wages alone, which might be avoided, thus amounts to £6,300,000 a year. This saving, with the additional value of lives prolonged in full vigour and increased energy, only represents a part of the pecuniary value of increased national health. In thousands of cases the loss of wages does not amount to a tenth part of the loss incurred by the many expenses of serious illness.

When war breaks out, entailing great sacrifice of life, resulting in a great number of deaths, public attention becomes directed to such loss and wastage, but under normal conditions we probably do not pause to consider that the *annual* loss of life by preventable disease actually far exceeds loss by war. If such analogy be drawn, the facts become almost startling. As an example, at the time of the last Napoleonic war our loss from preventable typhus alone, attacking persons in the vigour of life, appeared to be double the amount of what was suffered by the allied armies in the Battle of Waterloo. Again, if we reflect, we shall see that the loss in each year is equivalent to the extermination of a whole county. For example, in 1838 the deaths from zymotic diseases in England and Wales numbered no less than 56,461, or exactly the number required to completely depopulate the county of Westmorland.

A search through the records of the last fifty years reveals the fact that it is only in the last two

decades that any improvement in this respect has been made. For we find, taking each tenth year from 1860, that the deaths from this cause were :

Year.	Deaths from Preventable Causes.
1860	75,849
1870	120,511
1880	106,205
1890	69,397
1900	75,943

But the mere numbers give a wrong impression, as it is necessary to allow for increase of population ; and taking the death-rate per 1,000 inhabitants from infectious diseases, we have :

Year.	Per 1,000 Inhabitants.
1838	3·63
1860	3·77
1870	5·30
1880	4·09
1890	2·39
1900	2·33

From this we see that the years 1870 and 1880 were above the normal, whilst 1900, though having a slightly larger total, is, owing to increase of population, a better year than 1890 and considerably better than 1838.

In regard to the vast mass of human units, of the class most likely to be beneficially influenced—namely, unskilled workers—the huge loss resulting from indifferent health and lack of vigour may be viewed from the point of view of the physicist as serious loss in working and reproductive efficiency.

The normal output of the class may be stated in terms of the number of hours in the day, the number of days in the year, and the number of years in the lifetime, during which it can be put forth. Now the percentage of efficiency, in their case, is obviously dependent upon the ratio of the actual to the maximum available time of working. Hence, cessation due to illness, if this be material, seriously affects the efficiency in working of the industrial machine. Precisely the same reasoning obtains in regard to brain-workers. From this may be gleaned some idea of the paramount value—quite apart from social happiness—of national health.

Now we have to ask ourselves, What is the principal cause of illness? and if we answer that it is due to sanitary defect, we shall but be partially correct, for illness is in larger measure due to ignorance—principally ignorance of the value of cleanliness.

I have pointed out, in regard to ventilation, that the first essential for obtaining pure air inside the dwelling is that pure air should exist outside it. The importance of this was recently referred to by the Prime Minister as President of the British Association for the Advancement of Science in a discussion on our physical degeneration. He pointed out that he came from a district in Scotland noted for tall men of fine physique; yet not so very long ago the overcrowding of their dwellings was appalling whole families living in one room. That the physique

had been more or less maintained could but be explained by the fine air without.* The Prime Minister felt that we must keep distinct those causes of physical deterioration that were temporary and others which were permanent. Among the first of these causes—the effect of town life as distinguished from country life—he had often desired to know how medical men would analyze the various effects. What, for instance, were the differences, say, between town and rural life for persons working in a small factory?† The working-man in the village would often come home to lodgings no larger or more airy than those of the town worker, but the general surroundings were better.

Another source of great national loss is epidemic disease. Modern medical science, as we have seen, has made great and gratifying inroads upon this. It is therefore to be hoped and expected, with the awakening of further intelligence by the enlightenment of the masses—as also Town and Borough Councillors—coupled with less elastic law, that loss of life by epidemics will shortly be almost wholly obviated. It is to be hoped that that sad

* Again, if we consider the case of seamen, the deleterious effect of vitiated air in the forecastle must obviously be successfully combated by the revivifying effect of the sea air on deck.

† In Vol. I. I have touched upon means of rendering factories more healthy, whilst in Chapter IX. I have shown the deleterious effect and the necessity of selecting the most healthy illuminant available. It is regrettable, therefore, to find that in the First Garden City no provision has been made for anything but gas.

spectre of bigoted ignorance and deception, 'the conscientious objector' (or, as it should be written, *unconscientious*, for he who would willingly spread disease can have no conscience), will be rendered impotent. His gauche handiwork has within the last few years led to two fearful epidemics of small-pox in towns which shall be nameless, but characterized by narrow-mindedness and ignorance alike in the council chamber and the workshop; and although the spectacle of sacrifice of life in others would not greatly concern these 'conscientious' people, yet the loss of their own offspring might act as a deterrent. The time has surely arrived for the repeal of the 'Conscientious Objectors Act,' when we see the exquisitely beneficial effects of whole-heartedness in other nations,* effects which we allow to be vitiated by an infinitesimally small fraction of our total populace.

* Upon the passing of the law enforcing revaccination in Germany in 1874, the mortality from small-pox in the general population fell to two or three for every hundred thousand persons. In the German army *not a single death from small-pox* occurred during the twelve years following the enforcement of the new regulation; whilst during the same period the mortality in the Austrian and French armies, where no such practice was enforced, *remained absolutely unchecked.*

Without a compulsory law for the whole nation, a law observed by all, it is clear small-pox cannot be reduced to moderate proportions, and the only means of extirpating the disease altogether from Europe as an epidemic will be the thorough adoption, with all possible precautions, of compulsory vaccination and revaccination by European nations.

Concerning that matter of paramount national moment—physical deterioration—ours is happily an epoch marked by especial attention being devoted to hygienic reform. It is well that this is so, for it would appear also to be what is aptly termed in science the 'critical phase.' An important inquiry has just closed,* and the report contains—amongst the valuable information collected—a single sentence of great import to our nation: 'The Committee think it as well to state at once that the impressions gathered from the great majority of the witnesses examined do not support the belief that there is any *general progressive* physical deterioration . . . but they deemed it their duty to consider the causes and conditions of such physical degeneration *as is no doubt present in considerable classes of the community*, and to point out the means by which it can be most effectively diminished, more especially as it affects the young during the three periods of infancy, school age, and adolescence.' I have elsewhere dealt with both the relative mortality and the physical condition of the dwellers in towns and the country respectively. Now the *general progressive* degeneration is being stemmed by measures taken in regard to large towns. As the report mentions, 'Rookeries are being dispersed, enclosed yards opened out, cellar-dwellings and back-to-back houses are disappearing,' etc. If such reforms in conditions

* The Inter-departmental Committee on Physical Deterioration, 1904.

of life are already making their beneficial marks, how much more evident will become the amelioration due to new and scientifically designed cities! The present President of the Royal College of Physicians has also pointed out that the great progress made during the whole of the Victorian era has trended to preventing a general, national degeneration. These facts point to two things: (*a*) that there is yet time to prevent a *national* deterioration, and (*b*) that the deleterious effect of our great towns has been and is the principal cause.

Surely no place can be conceived where the blessings of perfect sanitation could be more readily secured than in new and carefully thought-out cities. Again, in such, with their limited communities, surely the opportunities for supervision and personal instruction would be unique.

It is clear, therefore, that we are justified in looking to 'Garden Cities' not only for increase in happiness due to the enjoyment of more perfect health, but also prolongation of life. The statistics referred to in the footnote* amply bear this out.

* The population of England and Wales at the last census was —for the towns about 21,000,000; for the rural districts about 8,000,000. Calculating the death-rates in the towns for corresponding age and sex, and comparing them with the same for the rural districts, we find that whereas the death-rate for the town is 23·32 per thousand, the death-rate in the country is only 17·62 per thousand. In other words, that whereas in the towns death on an average would occur at the age of about forty-five, in the country it would occur at the age of about sixty. But if

The bare statement of the figures by no means conveys to us an adequate idea of the national loss and social distress accruing from ill-health arising from overcrowding alone. We have to take into account, in addition to unnecessarily early death, the wasted years of sickness, poverty, misery and suffering, due to ill-health, entailed upon workers and their families; the consequent loss of ability to earn sufficient to keep themselves independent, whereby a heavy burden is cast upon the rates, as also upon relations, who themselves are scarce able to maintain themselves. I have referred to the estimated loss throughout the country; in towns, where the rate of wages ranks higher, it is still more serious. For there the average loss is put at twenty days, and taking these at four shillings represents a loss to the wage-earner of £4 per annum.

In such ideal cities it is to be assumed that the dictates of Hygeia and the recommendations of eminent students of the science would be embodied and vigorously obeyed—such, for example, as the

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we look further into these figures, and subdivide the towns, we find that in the congested parts of cities the death-rates are double those of the suburbs. In London the death-rate of the outer or suburban districts is only 15·4 per thousand, as compared with between 30 and 40 per thousand in the most crowded parts. That is to say, that whilst a man in the crowded districts would, on an average, only live to be, say, about thirty, in the suburbs he would live to be about seventy. In Liverpool the death-rate is double that of the rural districts surrounding it.

exclusive employment of public *abattoirs*, the slaughter-houses, easily-removable edifices, being situated at a distance from the town, and the work carried out under the supervision of the sanitary staff in the most humane manner, the animals being relieved from pain of death and brought to slaughter through narcotizing chambers, oblivious of their fate; the Jewish system of inspecting every carcase, with the improvement that the inspector would be a man of scientific knowledge; the food and water supplied to animals open, at all times, to inspection; the drinking-water of the inhabitants tested twice daily, and the use of lead-pipes prohibited; all manure removed from streets and stables daily, and this in covered vans; uninspected private laundries absolutely forbidden, and all linen disinfected (by vapour of formaline) before being passed in, and all implements used by hairdressers and barbers similarly sterilized. It is also of great importance* that the milk-supply should pass through as few hands as possible, and that milk-vendors should not be general dealers whose sale of milk is confined to a few quarts. In order to effect these objects, milk-depots should be formed in every town, obtaining their supply direct from the farms. This, it is believed, could be done without recourse to direct municipal action, but in all improvement Bills promoted by local authorities the insertion of provisions dealing with the milk-supply within their area

* *Vide* Report of the Inter-departmental Committee.

should be insisted on. Having regard to the acute difference of medical opinion as to the effects of sterilization, investigation, it is suggested, should be carried out in regard to the whole subject by a small body of experts. Milk, when drawn from the cow, should at once be refrigerated to a temperature of 40° F.

All this would be conveniently practicable and humanely beneficial to the community; but to produce a 'City of Health,' efficient steps must be taken also to exorcise the fiend of ignorance. This vitally important work should be carried into effect by two methods—(*a*) instruction to boys and men in schools and colleges; (*b*) demonstration to girls and mothers *at home*. 'The river of national health must rise from the homes of the people and from every home. Then it will become a great river on which every blessing will be borne,' wrote Richardson; adding, 'If we could get wives, mothers, and daughters to learn the habit of all that tends to health, we should soon have an easy victory, and doctors would almost cease to be known.'

This potent and poetic passage from Richardson shows that we should not remain content to wait for the benefits in futurity to accrue from instruction in hygiene as a part of education, but that active steps should be taken to at once instruct the public in general in the essentials of Public Health. As I write, such an inceptive step is being taken: Sir Joseph Farrer has to-day opened the Institute of

Hygiene. Its objects, briefly stated, are to exhibit and make known the best products in the way of food and medicine, to familiarize people with the laws of health, to explain sanitation, and to send forth lecturers who will be able to expound to public audiences how best to keep disease at bay. Most of our dangers as human beings arise from ignorance, and Nature makes us learn her lessons under the severest penalties. For generations the human race has been suffering, experimenting, and probing for truth, and although perfection will never be attained, we have in our possession to-day the accumulated results of centuries of costly experience. Yet to the masses the value of these results is unknown, and the moral is unheeded. The most rudimentary laws of hygiene are disregarded or defied, and thousands endanger their own lives and the lives of others by tolerating bad air and bad food, and by flying to bad remedies when medicine is required. The whole matter is made worse by the difficulties in obtaining unadulterated articles when required, and by the inducements offered to take deleterious articles in their stead. The new Institute proposes, among other things, to examine and guarantee the quality of the articles it exhibits, and to give an annual certificate as to their genuineness. If a new manufacture is good, not only will the Institute say so, but it will enable that new article to become known. If, on the contrary, any invention or appliance, any food or clothing or drug, pretends to

be the thing it is not, the Institute will refuse to give it a place—and the public must draw its own conclusions. Everything that the person in good health requires to keep him so, and everything that the person in poor health requires to improve his condition, will have a place, whether it be food and drink, medicine, coats, boots, filters, disinfectants, bedsteads, or stoves. In short, the Institute is to be educational and advisory, and the man who is enlightened as to the needs of the body has the least cause to fear an attack of the enemies of the body. Public health, as Sir Joseph was at pains to point out, is not a matter of recondite or remote theories, but of common sense, pure air, pure water, and cleanliness. Speaking for those who had to make a special study of disease and its prevention, he declared that any further reduction in the death-rate of this country must be looked for rather from the spread of education in personal and domestic hygiene than from further legislation or the work of the sanitary authorities.

The instruction necessary to be given in the household is neither intricate nor recondite, and need not tax the less intelligent. Habits of health are what should be sought to be imparted. 'All turns on habit, and all is said in two lines :

'Health is tidiness,
Tidiness is habit.'

The habit of the tidy person is healthy, while that of the slovenly person is not healthy and never can

be.' The learned physician further averred that no point in the warfare against disease is so important as that of getting the women of the household to work heart and soul after good health in the household. 'I am never tired of repeating this fact, and I never shall be until I cease to labour,' said he, and pointed out that the excellences of tidy women in respect to order and cleanliness have, without any distinct system or mode of scientific education, saved us often from severe and fatal outbreaks of disease.

Here, then, is a field of vast usefulness for women in Garden Cities, as elsewhere. First to acquaint themselves with habits of health and the principles of hygiene—with a thoroughness worthy of their sex—and then to impart it—with the simplicity and kindly solicitude inherent to their sex—to their less favoured sisters; buoyed up the while by the cognizance that in such they are performing valuable work to the community at large.

Great hopes are entertained, concurrently with improvement in health and physique, in Garden Cities of securing increase in happiness by elevation of the moral tone. Surely such hopes are both justifiable and realizable. 'Most of the larger cities of England, owing to their ill-regulated and anarchic growth, have become the very cancers of our body politic,' and the fell disease is deemed to be well-nigh incurable. The momentous question is 'In smaller and well-regulated communities of studied growth, can the system be so purified that there shall be no recrudescence?' To answer the question

one needs must seek the primary cause of the disease. Surely the debility which makes them prone is their very vastness, the insinûating venom stealing in by reason of the inability efficiently to reach the susceptible masses.

If the river of health is to rise from the homes of the people, surely happiness must be made to bubble up from the same source. If the beneficent rod of Aaron must touch at every door, who more worthy to carry it thither than chaste and gentle woman? Who more potently could wield it? But the waters will not gush forth at the first touch. Full well the gentle workers know it must be applied, re-applied, and cautiously pressed home with the gentle force of tender persuasion; full well they know that the spring-head will not show itself except in the awakening light of intelligence as it gradually illumines the darkness of ignorance. To such lenitive and alienative influence we would do well to look for much amelioration and the fostering of much happiness.

There be those who look forward to 'The First Garden City' as a huge slum-emptying device. Let them be conjured to desist if they have the welfare of their unfortunate protégés sincerely at heart. You cannot make a silk purse out of a sow's ear, neither can you build a sound city with slum material. It should be obvious to all that a successful city must contain—and be controlled by—*successful* units. Civic strength and success cannot be obtained from individual weakness and failure.

But if, as I suggest, it should be composed of *every* class, then would there be room for the less favoured. Then would there be opportunity for transferring to pleasanter surroundings *some* of the slum-dwellers of the great cities. For the miles upon miles of slums are not peopled alone by the unworthy and dissolute; they are but leavened by them, though often to such an extent as to make one doubt the genuineness of the more respectable who live in such company; in great towns, however, this is inevitable. In the new cities the unskilled labourer will be required, and so will the lesser skilled seamstress. Let them, then, be sought out and the deserving sent to brighter and happier surroundings, but only in proper proportion. This done and success attained, other such cities will spring up, and to each might be sent *its* fair and desired proportion. And thus might the pressure in the slums of the Colossus be relieved, thus the distress of the deserving alleviated. The prudent cultivator hoes and casts out the weeds and useless nutriment-sucking parasites that his crop may not be strangled—that it may have freedom to grow more sturdily. Where is the charity—nay, the common sense—in pitchforking efficient roots and 'waster' weeds alike upon virgin soil? It has been well said that 'character is one amongst other economic causes.' Let the well-wisher to Garden Cities plant character therein with the foresight and care with which he would plant seed in the food-producing belt around it.

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The ' Alexandra ' Ward in Dr. Barnardo's Home, Stepney.

LET there, moreover, be planted from the first, self-dependence. 'Some of the most satisfactory work which can be done is that of fitting the incompetent or disabled to take their place in the ranks of the independent. It is not always easy. When people have been living for some time from hand to mouth, and have learned by their own experience or that of their neighbours that it is possible to live without earning enough to live upon, they come to regard it as a part of the natural order of things, and will take no trouble to change it. But where there is any energy and character left the most hopeless-seeming cases can be put right with sufficient care and patience.' Thus writes Mrs. Bosanquet, an authority upon the slum districts of the Metropolis. If one inquires more closely into the cause of much of the absence of self-dependence, one is forced to admit it is due largely to so-called charity—to indiscriminate, unsystematized charity. It has, time after time, been shown conclusively that the constant flow of this form of charity in the industrial districts of large towns has had

a demoralizing effect upon the industrial units. Thus, speaking of the effects of the various charities operating within her own district, the able authoress says: 'The parish is beset with them at certain seasons of the year; and money is flung amongst us much as nuts are flung to boys to scramble for. Soup-kitchens, philanthropic societies, country holiday funds, ragged school funds, funds from all the enterprising newspapers, and funds from all the political clubs in the district; church funds and chapel funds, missions and mothers' meetings, all are engaged in pouring money into a slough of poverty which swallows it up and leaves no trace of improvement. No one is the richer for all the thousands of pounds squandered in the parish, for it is given away in miserable little doles which are incapable of helping any man to solid ground, and only help to "keep him down." It has even been suggested that the amount of charity which comes into the parish bears a certain fixed relation to the amount taken by the public-houses; but it would be difficult to prove any causal connection.'* Again,

* Unhappily, a direct connection has been all too convincingly established. The evidence before the Royal Commission, which sat so long ago as 1834, shows that, both in town and country, the habits of drinking common to those who received out-door as well as those who received in-door relief were most developed amongst the out-door population. In the London parishes a considerable proportion of the out-door relief was spent in the gin-shop *immediately after the pauper had departed with the money from the pay-table of the parish.* In St. George's, Southwark, it

in the report upon an inquiry instituted in 1888 into the working of the charities in an East London parish, we find the committee bearing strong witness to their mischievous influence, as the following extract from their report shows: 'The indiscriminate doling out of dead men's sixpences or half-quartern loaves to those who can shout the loudest, struggle the hardest, or wail the most piteously, does not carry with it a power to bless, but the reverse. It finds the necessitous and poor "down," and simply keeps them, almost irremediably, where they are. Indeed, it is to be feared that the charity "doles" have helped to rivet mendicant and pauper habits upon many in our midst, who, except for the demoralizing influence exercised thereby, would have struggled to maintain an honourable and commendable independence.'

A Whitechapel clergyman thus describes the effect of charity upon a working man: 'He proceeds from year to year with a charity to meet every exigency of health and sickness. The time at length arrives when, either from the number of children born to him under the kind superintendence of the Lying-in, the Royal Maternity, or the Benevolent Society, or from a desire to add a legal and permanent provision to the more precarious supplies

was discovered that £30 out of every £100 of money given as out-door relief was spent in the public-house during the same day. In another parish a publican stated that he received £2 more for gin on Board days than on any other day.

of voluntary charity, he solicits parish relief. . . . In this uniform alternation of voluntary and compulsory relief he draws towards the close of his mendicant existence. Before leaving the world, he might, perhaps, return thanks to the public. He has been born for nothing; he has been nursed for nothing; he has been clothed for nothing; he has been educated for nothing; he has been put out in the world for nothing; he has had medicine and medical attention for nothing; and he has had his children also born, nursed, clothed, fed, educated, established, and physicked for nothing. . . . I wish it to be particularly understood that in thus describing the operation of charity in any district I have been giving an *ordinary*, and not an *extraordinary*, instance. I might have included many other details, some of them of a far more aggravated and offensive nature. I have contented myself, however, with describing the state of the district as regards charitable relief, and the extent to which that relief *may be*, and actually *is*, made to minister to improvidence and dependence.'

The demoralizing influence, moreover, extends to the neighbours and acquaintances of those who may have been indiscriminately and undeservedly assisted. A loose and far from industrious workman, who may be restrained from becoming absolutely dissolute by the thought of what may become of his children, when he sees that his neighbour is positively a gainer by his neglect—for his children are

better cared for on his abandoning honest effort—discards his good resolutions and becomes degraded. And so the mischief spreads downwards. But, unfortunately, it also spreads upwards; for the more respectable commence to argue that they receive no return for their respectability and honest endeavour, whilst, on the contrary, they see that the loose and lazy command assistance. Again, with mothers of a sort, if they know that by turning their children into the streets they will learn where to pick up a meal, "and no questions asked," they are encouraged to adopt that course; hence they are made to suffer morally, and their offspring physically.

Thus we see that the efficiency of charity, if it resolve itself into the mere provision of funds, is exceedingly small. We see also that, to raise this efficiency, *practical* charity is what is required—well thought out schemes of permanent alleviation as opposed to spasmodic gifts of small temporary benefit and of permanent value none. We have the opinion of one* practically and intimately acquainted with the workings of charity as they exist to-day in the following passage: 'Let us think for a moment why it is that so much of our philanthropic work has failed. We are surrounded by institutions of every kind for wrestling with poverty and disease, but poverty and disease are still unvanquished. Every winter sees millions devoted to the relief of the poor, and the poor still cry out that their hunger and cold

* Mrs. Bosanquet.

are unrelieved. It would seem almost incredible that such large efforts could be made with so small results, if, indeed, we did not know how little thought and care those efforts often represent. What would be the position of any man who carried on his business with as little care and zeal as he devotes to his charities, who used no more discrimination in investing his capital than he does in selecting the institution or person to be the recipient of his benefactions, who bestowed as little forethought to the consequences of his sales and purchases as he does to the consequences of responding to begging-letters and sensational appeals? No one would wonder if such a man should fail in business; and why should we wonder if a similar negligence brings failure in the difficult and complicated relations of social work?'

Let it not be thought for an instant that by any remarks of my own or references to the opinion of others I could wish to see the flood-gates of charity closed or even lowered. Far be such a thought from us; but I would enter an earnest plea for systematized charity, for *practical* as opposed to impracticable charity. Then would it fulfil the Shakesperian conception of its sister mercy; for it would not be strained, and would bless him that receives as well as him who gives. The true work of charity should, therefore, be to assist by raising the moral tone, by *fostering self-help*, and thereby leading up to independence.

To accomplish this there can be but one success-

ful course — the work cannot be accomplished collectively—it must be effected individually, for the first essential is a full acquaintance and understanding of the units to be operated upon. That this, in our vast hives of industry, presents almost insuperable difficulties, if it is to be carried out to any appreciable extent, needs not to be said; but, on the other hand, it is easy to appreciate that the limitation of populations that would be provided for in cities of the type now under discussion would immensely facilitate the achievement of the desirable end.

The facilities for domiciliary influence and enlightenment in cities having limited populations, in which the poorer would only bear their fair proportion, would be very great; therefore much is to be hoped for in this direction. In regard to it, it must be remembered that we are concerned only with that section of the industrial material that may have been transferred thither from the slums. The middle-class workers, who would be there to ply their trade under the more pleasant and more rational conditions, would require no such domiciliary treatment. Nevertheless, they would be able to reap the advantages of the well-chosen subjects forming the dissertations given within the walls of the Technical College and other institutions within their easy reach.

Though the spirit of religion and charity be inseparable, yet their practical functionment, it would

appear, should be kept quite distinct. That of the first should be to raise the moral tone of rich and poor alike; that of the second to transfer, it may be by way of the Church, the beneficence of those who 'have and to spare' to those who are in need. This, however, should be effected in such manner as not to demoralize, but rather to elevate the moral status of the recipients. This is perfectly consistent and, indeed, sequential, for by systematized charity it is of its very essence that *help should be afforded to the deserving*, in itself implying a measure of merit in the benefited. Whether the Church should directly perform the function of charity may be debatable, but the weight of evidence certainly points to the conclusion that it should not.

From time immemorial the system of charity by dole has been the mode. It commenced with the monasteries, whose beneficence, unwisely bestowed, had the effect of saddling upon them bodies of dependents. Thus they created more poverty than they relieved. We have, then, to ask ourselves whether a perpetuation of an old-world system into the twentieth century is calculated to meet the wants and to fulfil the conditions of modern civilization. The work of the Church in this relation, if it resolve itself into mere alms-giving, it can be shown, would be better performed by a specially constituted organization, with the further advantage that a certain diminution of prestige and loss of dignity entailed upon it by the process would be avoided,

and perhaps worship within its walls rendered more pure. This cannot be better put than in the words of Mrs. Bosanquet, describing the actual effect as occurring in an East-End London parish: 'You may attend the old parish church some week-day, and find at morning service a dozen or so of old women, and reflect upon the rest and comfort it must be to them to cease awhile from their toil and find consolation in their church. Then service ends, and you note as they rise that each carries a bag, and that one and all—the whole congregation without exception—troop into the vestry, there to receive loaves and tickets, and the whole matter is transformed into one of sordid barter and exchange. I have been told by a clergyman how, on first coming to his East-End parish, he was pleasantly surprised by the large number of those who attended the Communion service; then he found that it was customary for the service to be followed by the distribution of alms to all who had attended, and thinking the connection an unseemly one, he broke it, and gave the alms at a more fitting season. The majority of the communicants forthwith vanished, leaving an honest few who must have felt that the presence of the "cadgers" had been nothing less than an insult to their religion.'

Having regard to that strong trait, characteristic of every class—a thirst for individual gain—is it to be wondered at, in relation to the more ignorant, that they should—under these circumstances—be

led to the church principally for purposes of such material gain, and to regard it in a light far different from what could be wished, and what, indeed, is due to it? That this is neither gratifying nor satisfying to the Church could not be more conclusively shown than by the statement made by a parish church magazine: 'Our experience leads us deliberately to avow it as our belief that by far the greater part of our population regard the Church solely and simply as an institution with enormous wealth at its disposal, and the clergy as a body of men—mostly fools—who have been ordained for the express purpose of running about the parish with a can of soup in one hand and a half-hundredweight of coals in the other.'

It is obvious, if the poor know that their parish is full of laggards, loafers, and idlers, and that charity is ever ready to maintain them as such, it must have a demoralizing effect upon the better-minded who are only just able to 'make both ends meet.' The duty of guardians is obvious: that they should spare no pains to see that benefit should accrue to the deserving, and that the undeserving should apply in vain, except to be inducted to honest work, for it must be remembered that every loafer helped represents an increased burden on that more self-respecting and respectable class which can only just 'grub along' without extraneous aid. A perusal of the figures to be found later in this chapter shows the very serious discrepancy in the amount the respectable hard-working and self-

supporting are called upon to pay for the maintenance of the State-supported, as between the Metropolis and the rest of the country. Why should this be in the 'Metropolis of the world,' the 'hub of the universe'? The only reply capable of adequately explaining the cause is that year after year—and this for many years—a vast stream of paupers and undesirables, the drainage of the indigent of all countries, has been allowed to pour into not only London, but other ports. Yet, with supreme perversity, the very people who are eternally crying out for the betterment of the British working men and women are those who oppose legislation having for its object the stemming of this influent stream. To be perfectly just, one should admit that a certain proportion of the units of such influx, though they have been unable to support themselves in their own country, show their ability to do so here when given a chance; moreover, that the incessant and uncalled-for strikes of our own people have caused an influx of others, who could be made to take their places, to be looked upon with something akin to satisfaction. But what is the ultimate effect? It is that the general rate of earnings has been thereby so reduced that, added to poverty and misery, corresponding multitudes of our own people have had to 'go on the rates.'

But need we descend to the poor—worshipping in anticipation and expectation of the dole—to witness

the degradation of religion by this same trait of self-interest? Many are they who go to church merely 'for appearance,' merely for the personal gain to themselves the practice will bring; but this does not expose the weakness so positively as the very words of the service. The general idea and universally accepted significance of public worship is that it is an outward and visible sign of worship *per se* and thanksgiving for blessings received. Such worship and thanksgiving are surely degraded when one notes with regret there is *always something asked for*. Thanks are offered in prayer after prayer 'in the hope of everlasting life,' 'in hope of the life to come,' and such-like. How much more pure would worship be were it unalloyed praise and thanksgiving! Then, again, it is all too noticeable that the vehemence of worship—and request—varies directly with the urgency for assistance. Normal conditions may not be productive of an overwhelming measure of thankfulness, but abnormal circumstances are productive of an outburst of self-interested prayer. Were an exemplification called for, it could not be better found than in the case of the war at this moment raging. An unholy war, brought about by unwarrantable trespass upon the part of a repressive and immoral nation; a war entered upon with the avowed purpose of annihilating another nation, of driving its inhabitants into the sea, and of giving them no quarter. But when enlightened intelligence, valour, and a righteous cause are found to be

'Going to Sunday School' in a Garden Village.

'Going to Church' in a Garden Village.

very potent factors in the frustration of diabolical intent, what do we find? The words of M. Posselianine shall answer:

'We Russians have completely forgotten the spiritual forces whose assistance we were formerly wont to invoke when misfortune overtook our country, when earthly means were of no avail, and when nothing but a miracle could save us. When the Russians, at that time still pagans, attacked Constantinople, the Patriarch dipped the robe of the Mother of God into the sea, and the tempests which thereupon arose immediately scattered the ships of the Russians. When Tamerlane was marching on Moscow with the intention of destroying it, the ikon of the Holy Virgin was sent for from Vladimir, and the instant it reached Moscow its threatening apparition dismayed Tamerlane and drove him away. When Russia was perishing during the troubles of the "interregnum," a three days' fast was imposed on all Russians, including infants at the breast, and the people offered up supplications for the salvation of their country.

'Now the situation is serious. It would be an awful thing if the efforts of the defenders of Port Arthur proved futile. We must snatch that unfortunate fortress from the clutches of the Japanese, and if we are to succeed in our task, nothing but hope in Almighty God can avail us. The Russian people must pray for the safety of Port Arthur as the woman of Canaan prayed for her daughter. Let the heavens tremble with those cries of souls in distress which are not heard on earth, but which are heard in heaven, and may God listen to our prayer!

'If the Holy Synod had ordained a three days' fast for the purpose of beseeching God to save the fortress, would not hundreds of thousands of pilgrims have performed such an act of supplication? Unto him that asks shall be given. If a day of national intercession and fasting had been appointed, and if on that day there had been processions in every town and every village, would not such evidence of faith have *obliged Heaven to perform a miracle?* We have the Holy Virgin, who watches

over our country, and who has never forsaken those who entreat her aid. The examples of her intervention are innumerable. We possess a new and a great wonder-worker, Saint Serafin, who enjoys the favour of God. If we vowed to raise a national temple in his honour? Every day, every hour, is precious. We *must* pray for intercession.'

Wipe out this eternal prayer for intercession on 'our' behalf, this everlasting request for favours—we *will* be good on earth if we are promised everlasting life, if our adversaries are slain for us, is virtually the form of our worship—obliterate this, and replace it by pure worship and heartfelt thankfulness, and by how much would public worship be elevated! Show by example the vaunted 'peace and goodwill to all men' by cessation of internecine strife, dissension and bickerings upon the part of religious sects, and those whose creeds differ but in the merest details, and by how much would religion be the more respected! Separate monetary gifts and doles from the service of the Church, and by how much would worship therein be purified!

If Church workers could be relieved of responsibility in regard to the financial side, this ending, as far as they are concerned, in their reporting the merits of the case—from their intimate personal knowledge—to the organization specially appointed, they could then address themselves to the matter of primary importance, not only as viewed from the Church but as bearing upon the welfare of those who are to be monetarily assisted

through their intervention—namely, their own personal influence upon character. They, then, above all others—especially in combination with aid of a permanent nature—should be able to strengthen the weak, retrieve erring lives, and save from the brink those who otherwise would have fallen into the ever-gaping abyss of despair and degradation.

But the great work women Church-workers are prepollent to carry out lies not alone in the administration of comfort and the indirect alleviation of monetary need; it lies still more potently in the moral influence they can impart, an influence which will act automatically in regard to happiness in the dwelling. To instil wholesome habits, the prevention of waste—for poor people are exceedingly wasteful—and, equal to all in its importance to them, the inculcation of the habit and value of thrift, are great works they are pre-eminently adapted to carry out. As a means of carrying into effect the latter object by that most effective form of persuasion 'actual demonstration,' nothing is more efficacious than that admirable system the 'collecting-book.' It sounds somewhat startling that in place of the visitor calling with the all-too-much-expected contribution she should call for a subscription. Yet, *with the right material*, the process has come to be much appreciated. Needless to say, the subscription is to go to swell the frugal deposit in the savings-bank, and it is said that, in homes where the friendly chat of the visitor is really appreciated, at its conclusion

the well-meaning housewife brings forth with pride her few coppers, for she is astounded by the manner in which the pence mount up to shillings. And if each time forty-eight of them had been paid in that visitor asked to be allowed to make them into a 'crown,' not the least thought of dependence need shade the brow of the worker, yet the snowball would be pushed the more quickly forward, and the kind-hearted visitor would find every kind of excuse for such almonry—foremost being the knowledge that 'help to self-help' is the truest form of charity.

What is required is not only *systematized charity*, but, in the case of the able-bodied, the *gift of work* in preference to the gift of money or articles of sustenance. The material cheer of the charity gift is, in the well-deserving, marred by the mental depression it induces. To them 'the bread of toil' is sweeter than 'the bread of charity.' But the provision of work is a far more difficult matter than the provision of money; the latter can be provided instantly and in exact proportion to the distress prevalent. In regard to work, to provide for an ever fluctuating mass of labour unemployed presents a problem requiring great skill both in efficiently dealing with it and in systematization and organization. It is, however, the ideal and most perfect system of charity; in its working elevating, instead of depressing, influences may be brought to bear. True charity should ever strive to assist without pauperizing. Charity by gift and dole, *ex necessi-*

tate rei, must impart a degrading moral influence, whilst it at the same time pauperizes. The matter is one of paramount social and national importance, and this being so, I have ventured to touch upon the practical methods hitherto adopted in an appendix to this chapter.*

In a very able speech delivered before the Birmingham and District Poor Law Officers' Association by the Countess of Warwick, it was pointed out that nowadays 'everywhere in this country there are students of social science, who, with patient toil, are giving themselves to the study of the great question as to how the poverty with which the Poor Law deals may be lessened, and, indeed, how it may one day be banished altogether — banished, at least, so far that no man able and willing to work shall lack the means of earning his bread—a state of things, by the way, which implies

* From the evidence given before the Poor Law Relief Committee (Cottage Homes Committee), the conclusion was arrived at that 'the number of aged inmates of any workhouse *who can be described as deserving is not large*,' and the Committee further felt that classification in, and in connection with, workhouses would enable the Guardians much more satisfactorily to provide accommodation for the aged poor within the house. The Committee acknowledged—with the Royal Commission—that, 'as a general rule, Boards of Guardians are in the habit of granting outdoor relief to the aged and deserving poor, and that it is the exception to relieve them in the workhouse.' As the advocates for universal pensions have appealed to popularity by the picture that the poor in old age have no alternative before them but the workhouse, it appears necessary to draw attention to this fact.

that no man, *if able to work*, shall have his bread *unless he earns it*. . . . The community are, indeed, beginning to feel that an obligation lies upon it which does not end with the paying of the poor rate.' This is the true spirit in which charity should be administered, and it is devoutly to be hoped that the patient toil of the students of social science may culminate in the evolution of a scheme at once practical and businesslike, and one which would bring credit to this country as being efficiently workable and consonant with the mercantile tradition of our nation.

As a potent means of amelioration, we wisely turn to education, but as that great philanthropist the late Earl of Shaftesbury cogently pointed out, it is of small value to teach in schools, and there attempt to elevate, when such influence is entirely vitiated by the conditions subsisting in the homes of the poor, their constant contact with vice, and the counteracting influences to which they are there subjected. To carry the elevating and purifying influence thither is obviously the duty of the Church. The object of the establishment of Garden Cities being principally the decentralization of industry, we cannot here concern ourselves with units below the line of industrial utility. This clearly falls within the domain of the Church, and nothing could be more gratifying than that those who by its means had been raised from below that line should reap the benefits such cities have to offer.

Adhering strictly to the industrial side, it requires no profound probing to discover that the hardest lot in the industrial units falls upon women. I feel that not only do these deserve more compassion, but also our energetic co-operation to relieve the hardships under which they labour; I feel, moreover, that just as in regard to physical degeneration the proper period at which to strike is infancy, so in regard not only to this, but to moral improvement and industrial utility, the proper medium through which to work is woman, and especially mothers. Even from the more sordid point of view of national economics this must be equally true, for by efficiently ministering to the wants of childhood and youth the nation becomes correspondingly relieved from the necessity of looking after a high percentage of inefficients—of maimed and weaklings. For it must be remembered the percentage of the lame, the blind, and the deaf is much higher among the poor than the richer classes, this percentage being sadly increased, so to speak, by the young being called upon to rear the young, disablement arising from accidents caused through the nursing of infants by child nurses being appallingly great.

In the preceding volume I have endeavoured to impress the value of the crèche as materially assisting mothers not only in their industrial occupations, but also to rear their offspring more healthily and supply the nation with a generation of greater vigour. And now, as a sequence to this, and as

a measure of relief in the succeeding period—namely, early youth—I would venture to impress the great prepollence of the 'day-home.'

In regard to Garden Cities, I strongly advocate that the meals of the work-people should be partaken of in mess-rooms provided and maintained jointly by the factories. The provision of mess-rooms is now becoming more general in large factories, entailing a considerable expense upon the proprietors, which would be greatly reduced by the joint provision and control I suggest. In smaller workshops it is quite unreasonable to expect that suitable eating-rooms could be provided. But in the case of 'district' mess-rooms those employed in small workshops would reap equal benefit with those working in the larger factories; for these, on payment of the tariff rates, would be able to take their meals in comfort in light, airy, and spacious rooms and with an economy quite impossible in regard to their dwellings. The same would apply to women workers, and I would go farther and suggest that the two sexes should dine together. I have elsewhere shown that the narrow-minded prognostications that amusements provided for the working classes would result in unseemly behaviour has been entirely falsified. For the provision of music in public parks and in theatres on Sundays, so that such might be participated in by every grade of worker, has been productive of gratifying increase in orderliness and good behaviour. Why, therefore—it is surely reasonable

to ask—should not the rational system of men and women dining together at mid-day be productive of a similar result? One thing is abundantly obvious: it would provide a beneficial break and relaxation in the monotony of the day's toil.

I would go farther, and say, Let each man have a pint of good small beer. This, in combination with a good wholesome meal, would do more good than harm, whereas the amount drunk in the public-house on the way home and upon an empty stomach is highly deleterious. Contrast the comfort and the conviviality of such a meal with the crust and piece of ill-cooked meat eaten in the hand, oft-times standing, in a dirty inn, washed down with potions of strong beer. Such a meal would be looked forward to with pleasure during the morning's work, whilst acquaintances would be made, doubtless often culminating in suitable betrothals. In the case of married men whose wives do not work in factories, the latter should be allowed to come and dine beside their husbands, for, as I have endeavoured to show in Chapter IX., cooking in cottages is a most expensive and unsatisfactory operation.

Just as infants become an embarrassment during the day to women working in factories, so do their children when somewhat older and ineligible for the crèche. The difficulty is apparent in regard to women taking their meals away from home, such as charwomen and those who may be working at too great a distance from their homes to return for their

mid-day meal. To these the 'day-home' is a most valuable institution—one which, like the crèche, is to be found in number utterly inadequate to the requirements.

Perhaps it would be advisable, in illustration, to take the case of one such home as typical. There is a small association of benevolent people known as the 'Day-Home Society,' who have established in London homes at Gopsall Street and Hyde Road, Hoxton, the former for boys and the latter for girls; and also at Mortimer Road, De Beauvoir Town, East, for both boys and girls. These homes are for the children of poor widows, and the aim of the little society is "to provide food and shelter and motherly care for orphans whose one parent is absent from home working for their daily bread, and that the care may be extended over the whole school-life of the child." The rules are the following:

1. That the parent should pay weekly at the rate of not less than 1s. for each child. That a Union loaf should be taken in lieu of 6d. if the parent has parish allowance.

2. That the children shall be received at the Home by 8 o'clock—or earlier, if the parent has to leave for work—and remain until 7.30 in the evening, except on Saturday, when they leave at 2 o'clock.

3. Three meals are provided daily. Meat twice a week for dinner, other days soup or pudding. Breakfast and tea—cocoa or tea, and bread and dripping, treacle, jam, or butter.

4. That the children over four years old attend day-school regularly, school to be selected by the parent.

The object of the homes is the physical and

moral well-being and the assisting of the mother by relieving her during the day of the responsibility of her child. This she can take to the home as early as she likes. The day-home, therefore, plays the same beneficent part in regard to girls and lads as the crèche does in regard to the infants. I have endeavoured to impress that the charity—for at present it is nothing more nor less—is principally of physical value, due to extreme care and apposite nutrition; but it is known that the moral influence —through the mothers—is also great. But in providing homes for little lads of the critically susceptible age, both morally and physically, the importance of such work is at once apparent. Even with the small charge made for nutrition the effect upon health is marked; whilst the moral influence of solicitous instruction and the happy evenings cannot be measured. Although started by the Sisters of the Community of St. Peter, and always cared for by the clergy of St. Saviour's, Hoxton, and St. Peter's, De Beauvoir Town, no question as to creed or religion is ever asked of a mother or child. Newcomers are only asked for proof of the loss of husband or wife (since, if there is room, motherless as well as fatherless children are taken), and that they need the charity. Before admission each case is considered separately on its own merits, and when the earnings of the family are sufficient the parents are only too glad to pay a little more than the customary shilling a week per child.

The entrance form, which is as follows, is strictly enforced:

DAY-HOME SOCIETY.

FORM OF APPLICATION FOR ADMISSION.

GOPSALL STREET HOME (FOR 36 CHILDREN). No.....

Name of Parent or Guardian applying.....
Address.....
Employment of Applicant.....
Total Weekly Wages of family.....
Date of Death of Father and/or Mother (Certificate must be produced).....
Total Number of children in family.....
Names and ages of children seeking admission.....

Have children seeking admission been vaccinated?.....
Have children seeking admission lately had any infectious or contagious disease?.....
Is any child seeking admission subject to fits or other affliction of which the Committee ought to be aware?.....

Signature of Applicant.....

Date.....

NOTE.

The Homes are intended for children who have lost one or both parents.

No child will be received unless he or she has first been vaccinated.

No child under two years of age will be admitted to any Home except with older brothers and sisters.

The Committee reserve to themselves the right to refuse any child, otherwise eligible, whom they may think physically unsuited for the Homes.

This proves a stumbling-block to a good many so-called widows, and prevents the funds of the homes being diverted from their legitimate purpose. The object and scope, however, is more or less explained in the following letter:

Day-Home Society.

'47, HYDE ROAD, HOXTON, LONDON.
'*December* 2, 1903.

'DEAR SIR,

'I am only too pleased to tell you about our three homes, as I know how much they are really appreciated by hard-working poor people. The chief advantage seems to me to be that we have children under our care who are old enough to benefit by what they may learn later on in life. They are children who would otherwise be in the streets, as they are old enough to go to school, so cannot be locked in while their one parent goes to work. We have an admittance form (I enclose a specimen), and according to the wages we fix the payment—for widows usually one shilling a week, and for widowers one shilling and sixpence a week per child. We have various classes in the evenings for them. They come as early as they want after seven in the morning, and they stay until the parent comes from work to unlock the home. As you know, a "slum" child is grown up at fourteen years of age, and we have many young men and women come to see us who have never forgotten the lessons they learnt

when in the home—not necessarily religious, but home duties, cleanliness, good manners, etc. We are strict about the payments, though often we are told by a widow that she manages to keep them on less than a shilling a week at home; but if they stay out for a week or two on that plea the result is painfully apparent on their return. As you say, widowers are specially grateful, as they have otherwise to pay at least five shillings a week to a neighbour, who probably neglects their children, to send them right away to some home and so shift their responsibility, or to marry again. Please excuse so long a letter, but you ask for full particulars. The homes were originally started with an idea of their spreading in other districts, but our subscribers are practically a circle of private friends, and as we cannot afford to advertise, we are almost unknown. I enclose the very few amateur attempts at photography which I have and a report of last year's proceedings, and if there is anything further I can do I shall be pleased to do it.

'Yours truly,

(Signed) 'ELSIE NEVILL,

'(*Hon. Secretary*).

'A. R. SENNETT, ESQ.'

What happiness is imparted to some of the children in place of dire misery I think I cannot do better than point out by a direct example taken from one of the reports. 'One boy knows that

The Oldest and the Youngest in the Day Home.

A Group of Day Home Children on their Annual Holiday.

unless he can meet his mother as she leaves her place of work she will have no money for his weekly payment at the home, so he makes a point of getting off to fetch her; but if by chance he is ever too late, then this boy of twelve has to struggle back with her from the public-house. This particular mother had a girl and a boy in our homes. She is often literally mad with drink, and has once attempted to poison her children, and another time to drown them!' Through the instrumentality of the home the little girl has been placed in a private orphanage, but in spite of all that the home could do it was a terrible life for the child. The kind of life these poor little ones might otherwise lead may be evidenced from the fact that a small 'home' boy was found wandering in the streets with the door-key the other Sunday morning because 'Mother ain't been home all night.' He had put his little sister to bed and gone off to look for his mother.

A most pleasurable feature is that, by the well-directed benevolence of the friends of the society, the youngsters are each year enabled to enjoy a thoroughly happy holiday in the country. This is managed by taking cottages down in the country, whither the children are sent in parties of not more than sixteen in charge of two matrons. The children are received if over two years of age, and may continue at the home until the time they leave school—fourteen years old. In one illustration is shown the youngest and oldest boy for the time

being in one of the homes, whilst in another we see a group of the children when on their summer holiday. Evening classes are arranged and Bible classes, presided over by the Sisters, are held throughout the year. Whilst there are regular sewing classes, at which good needlework is done, the boys are encouraged to produce varied works of art—one of the drawing-class boys being engaged in the artists' department of the firm of Waterlow and Company. Others of the pleasant little party read and re-read the well-worn library books, of which they would be pleased to have more. A pleasant feature of these evenings is that frequently 'old' boys and girls come to them, and the little society is enabled to note with gratification what well-developed young people they invariably are.

Readers! Contrast the interior of these homes and the pleasant and profitable evenings spent therein with the chill and slushy slum streets of the very neighbourhood where these homes—so lamentably few in number—are situated; estimate their value, and ask yourselves if you could possibly do better than send your subscriptions for their maintenance and enlargement. In doing so, reflect how much of crime is due solely to the feeling of abject wretchedness, of utter loneliness. Why should I behave myself? Who cares? It is this reflection which causes us to view with unalloyed admiration the great homes near by—those originated by Dr. Barnardo—of some of the waifs in

A Batch of Waifs as received into Dr. Barnardo's Home.

which I am enabled to give illustrations. One might do far worse than to establish from the first a day-home in the First Garden City, making it too large for local requirements, and transfer to it for their holidays the children from those already at work in London.

I have considered the case of the 'day-home' in relation to women who go out to work. At first sight it might be thought that the advantages would not extend to women who work at home. But let us analyze this. There are thousands of women working in large towns in single rooms and garrets who can but earn from eightpence to a shilling per day. Moreover, this can only be done by working very quickly and for very long hours. The time spent in preparing three extra meals means time lost in wage-earning work. Add to this the cost of three meals, and consider if the poor slave would not be better off by paying twopence per diem to the 'day-home' to be relieved of the expenditure of both time and money.

If one reflects one cannot but arrive at the conclusion that of the workaday poor the lot of the woman is by far the hardest. There are, for example, a hundredfold more cases of men deserting their wives than wives their husbands. The woman who is thus deserted and has never learnt any trade—which, as I suggest under the head of Education, should be made compulsory—is in a pitiable plight. Unskilled labour, as machinery becomes more and more

perfected, is less and less required, and hence to assist such presents the greatest difficulty, because the market price of unskilled labour is necessarily low. If the widow or deserted woman have children, to look after them, to cook and to prepare their meals, to make and attend to their clothing, and to clean and keep in order her tenement is enough for her to be called upon to do. But in her changed position all this becomes merely subsidiary.

Women of the poorer order must need, it is obvious, discipline themselves to a hard life. 'This discipline begins with the little girl, who is made to bow her neck to the yoke of baby and the house-work. After that her life is one long toil; at best she does but change one task-master for another. When she begins to earn it is in the lowest ranks of work, at some almost mechanical "trade" which will exercise a small dexterity of hand at the cost of all intelligence and energy. Her parents will put her to something at which she can earn at once—something, therefore, which requires the minimum of training and could probably be done quite as well by machinery. Of course she is wretchedly paid; quantity of work is expected instead of quality, and the growing girl has all her powers exhausted at a time when she has most need to lay in a store of strength. It is then that the heaviest of her burdens, bad health, is laid upon her, and she will never escape from it. All the troubles she has to go

through will have to be met with undeveloped physical resources and an enfeebled constitution, which generally results in some definite disease as time goes on.'*

The cry should be 'Help the children! help the women!' But what of the man? *Indiscriminate charity* at once cries out 'Help him'—with doles, with dinners, with money to get more drink with. Why not be more consistent with common-sense? Why not practise *true charity*, and in no half-hearted manner 'help him'—to learn the lesson 'if any man will not work, neither shall he eat.' More concerning the well-meaning working man and suggestions for his welfare will be found later.

Here I will confine myself to a few remarks concerning the girls and the boys. Money in this case, if given directly, it is obvious would be worse than useless. What is absolutely necessary is personal contact and moral influence, combined with most carefully thought-out system and organization. It would be presumption on my part to indicate the lines upon which such should be carried out in Garden Cities—places ostensibly proposed for the purpose of alleviating the hardships and disabilities inherent to the lot of our workers in the substratum of our industrial community. In them all that is experimental should be resorted to in the least degree possible. What is wanted is the installation of all that is beneficial and of *proved* worth and

success. Good might therefore accrue from my pointedly referring to a singularly successful scheme and institution inaugurated for the welfare of work-aday girls—girls of a type and occupation constituting them of the least promising material, and, *primâ facie*, rendering the process of their transmutation and transportation into a higher stratum of the industrial fabric most difficult. I refer to the administration of the Deptford Fund and the working of the Albany Institute in that densely-populated district of industrial South London. Ten years ago this Fund was established by H.R.H. the Duchess of Albany to assist the poor of Deptford; but it was not dissipated in gift and dole and lost in the ocean of indiscriminate charity, but, on the contrary, was administered by an executive committee of ladies and gentlemen well qualified, as the decade of working so abundantly demonstrates, to carry on the good work. Its success, moreover, has not been due, as perhaps at first sight might be inferred, to the provision upon inception of a well-lined treasury-chest, for, on the other hand, a start was made in a most modest manner. The practical and varied work was commenced, and for a time carried on, in a small house, 47, Albury Street, Deptford, purchased by the chairman and honorary treasurer, Mr. Alfred H. Tarleton, and presented by him, together with No. 51 in the same street, to the committee as a freehold property. In the few words denominating its scope and object may be

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At work in the Ironing Room, Dr. Barnardo's Home.

The Laundry at Dr. Barnardo's Home.

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read at once the secret of its success. Its scope is set out in two words—non-political, *pan-denominational;* its object, 'to assist and relieve the distressed poor, wherever possible in conjunction with the local clergy and workers, *and always with discretion and discrimination*, the greatest care being taken *in every case to avoid imposition.*' What this success has been is evidenced by the fact that in less than ten years its industrial membership has increased more than tenfold. Yet, whilst the capacity of the Institute has increased out of all proportion, to-day it is wholly inadequate; for this list of membership is unhappily supplemented by a large 'Waiting List'—girls who sit patiently on stairs, window-sills, and such-like, taking part as best they may in the sewing-class in progress, week after week, in the vain hope of there being a vacancy which will enable the excluding notice 'Club Full' to be removed for their benefit.

What these sewing-classes mean to these girls, ready and willing to be enlightened both practically and mentally, can best be appreciated by lady readers. One is informed, in regard to this class of workers, that underclothing does not weigh with the factory girl when a gay and feathered hat is put in the balance against it. It may shock the proprieties, but the fact remains that at the inception of these valuable sewing-classes 'not a single member of the embryo club possessed an undergarment beyond the scant petticoats they wore.'

The suggestion that any other condition of things was desirable was at first treated with the utmost scorn, but one by one they fell into line, and asked to be allowed to try and make some things for themselves. Even their best friends must admit the roughness of the material to be worked upon, and it serves to emphasize the courage and energy of Mrs. Lamert, the secretary, to say nothing of that of the Duchess herself, who visited the girls at their work in the unsavoury surroundings of the huge meat-market. One of Mrs. Lamert's first experiences was at once significant, sad, and amusing. She had invited a number of these girls to tea one evening at the premises of the Fund. In goodly numbers they arrived, prepared to scoff, though arrayed in their best. But, lo! when their hostess moved to the tea-table to say grace, not a particle of food was visible on the table. Scones, bread, butter, cake—all had been swept from the board, and had been stuffed into pockets and bags. Then ensued the first fight with such degradation, the weapon employed a good straight talk, and one by one the eatables reappeared, and tea was concluded in peace. This, maybe, was the first appeal that had ever been made to their better natures. Inch by nch they gave in. Nothing could have appealed more strongly to them than the direct sympathies of ladies and gentlemen conscious of the lives they led, their limitations, and their disabilities, who were wishful to come in touch with them, and to help

them to the better enjoyment of their lives, whilst the helpers themselves could—from their point of view—reap no benefit. A great and beneficent change gradually came over the erstwhile pilfering party and their congeners. The big feathered hats, we are told, came to be regarded as not "the thing," and "sailors" became "all the go." Divine discontent had been implanted, for these rough, hard-working girls became ashamed if they did not possess at least one change of underclothing. But the awakening to a perception of a higher moral life, beyond the gratifying improvement in their manners, physique, voices—for they are taught to sing—speech, and dress, is most eloquently expressed in their voluntary resolution to exclude from their club all of loose character, and any girl who is not prepared to behave in a manner calculated to redound to the credit of their coterie.

It should be mentioned, to the credit of our work-aday girls, that they are far more particular in regard to their appearance than men. Those who understand such matters aver that the average work-girl is wonderfully clever in making a little money go a long way in the matter of dress. That their taste should be of the louder *genre* matters not—it will right itself; but what is of paramount importance in their own interests and the economics of reproduction is that they should be made more appreciative of the kind of clothing necessary for the preservation of health. In this regard the good

sense of the Northern operatives stands out in contrast to the female workers of the Metropolis. When in textile towns, one is always pleased to note the cleanliness of the mill operatives, as also the appropriateness of their workaday costume—the warm shawl thrown over the head is always the accompaniment to strong boots upon the feet. The thin and shiny foot-gear of the London industrial inamorato, together with finery of inappropriate texture of clothing material, has doubtless much to answer for in regard to sickness. Northern cleanliness is, moreover, apparent in regard to the male operative; take, for example, such a town as Oldham.

To turn to the boys, it is obvious that after school age there is urgent necessity for the provision of means of self-improvement and recreation similar to those afforded by day-homes, to which I have adverted as being so valuable during the school-attendance years. Seven hundred boys and girls find pleasant surroundings and pass happy evenings in the outgrown institute, the birth and growth of which I have just briefly described. For the boys there is drill—with real rifles and a real sergeant—boxing, and tug-of-war; for the girls, dancing, dolls, and a doll's-house, threading beads, making needle-books of old Christmas cards; and for both girls and boys there is a 'quiet games' room and a 'painting room.' There is, moreover, the summer treat and the Christmas fête. But apart from the

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At work in the Smithy at Dr. Barnardo's Home.

happiness they experience, they are at the same time, almost without knowing it, morally elevated in a surprising degree. Such organizations, it has been pointed out, and must be borne in mind, are intended to work in amicable collusion with the beneficent work of the clergy and lay helpers of industrial districts. But the moral influence they are able to bring to bear upon the young, it need scarcely be pointed out, far exceeds the influence which priest or pastor can convey by public preaching and admonition. The fruit of such work can only be gathered through the matured. To expatiate upon the moral value and happiness which could be made to accrue from the existence of an adequate number of boys' clubs would be mere waste of space. I will therefore refer only to the need.

In the twenty-eight Metropolitan boroughs there are 291,725 working lads between fourteen and twenty-one, and of this immense population only 25,000 are members of decent boys' clubs. These figures amply justify Sir Henry Burdett in the appeal he is making through the Twentieth Century League for the establishment of more clubs and playing fields in the Metropolitan area. It is obvious that boys and lads with no other place in which to spend their leisure than the open streets must degenerate physically and mentally. Some place is essential to their development, especially as many of them come from homes of only one or two rooms, and a well-conducted club is particularly to

be recommended. At present there are 465 decent clubs for boys, but this number is far from adequate to the need. Sir. Henry Burdett is asking twenty-eight ladies and twenty-eight gentlemen to provide £1,000 for a club worthy the object, and a large playing-field for each of the twenty-eight London boroughs. The appeal has the support of H.R.H. the Princess of Wales, and it is sincerely to be hoped it may be successful. In such clubs a really efficient gymnasium should find place. Billiard-tables and reading-rooms are all very well *per se*, but what the boy of the East End most needs is physical exercise and the educative influence of discipline.

Of all systems devised for the relief of the poor, none has proved so thoroughly successful as that put into practice in Germany in the towns of Elberfeld and Leipzig. It was the invention of one Daniel von der Heydt, a banker and city councillor of Elberfeld, and has become known as the Elberfeld system. The underlying principle consists in the appointment, from among the ordinary citizens, of a large number of workers and the dividing of the town into a large number of sections, the business of the workers being to thoroughly look after the poor of the district entrusted to their charge.

'No one in our city shall starve, go ragged, or perish with cold' is the motto of the organization and the object of their work. In Germany there are no poor rates as we have them in England to draw upon, therefore the city sets aside a portion of

its annual budget for the relief of the poor, and what is then wanted is a means of distributing this relief in the most effective and most economical manner. This the Elberfeld system has accomplished with a thoroughness unattained by any other.

The real business of distribution falls on the *Armenpfleger*, men who may be termed the almoners of the city and 'helpers of the poor.' In Elberfeld, with a population of 140,000 persons, there are 500 of these helpers. The effect of this is that an almoner has seldom more than a couple of cases to look after at a time; therefore he is able to attend to them in a thorough and helpful manner. The city is divided into some thirty-six districts, and each district is supplied with its twelve or fourteen almoners, presided over by a 'District President' (*District-Vorsitzer*). The almoners meet every fortnight to discuss the various cases they have to deal with. The Presidents form a Central Board, headed by a 'Poor Council' (*Armen-Verwaltung*) consisting of a Chairman, four city delegates, and four citizens. All these men are elected for three years' service, and at the end of their period may retire or may offer themselves for re-election; and in nearly every case they do offer themselves, for it has come to be regarded as an honour to be nominated as an almoner. Yet every citizen is liable to be so nominated, and cannot refuse to perform his three years' service if requested. All these workers are

purely honorary, but to carry out the almonry there is the office of the Administration, located at the city hall. This has its staff of Secretary, clerks, etc., constituting the salaried portion of the Poor Law administrative machinery of the city.

The inhabitants of Leipzig early saw the benefit to be derived from the systematic work of Elberfeld, and adopted it for their own city. To all intents it is worked in the same manner, except that the almoners have charge of a larger number of cases, generally four, but there may be six, or even eight, at a time to look after; the entire population (nearly 400,000 persons) being divided into eighty districts, and having some thousand almoners at work among them.

If we examine the working of the system, we find that each almoner knows his ward thoroughly; he visits the people, sees their homes, knows their work, informs himself of their character, how much they earn, their habits, good or bad, etc., and should they come into temporary difficulty through illness or loss of work, he is there ready to assist them. In addition to the domiciliary visits he makes to his cases, every almoner is 'at home'—like a medical man—at a fixed hour on certain days of the week, when any of the poor in his district can visit him and lay their wants before him. In case of sickness or when those in need are 'too proud' to call upon him, it is competent for a neighbour or acquaintance to go and report distress. A strong point and

valuable feature of the Elberfeld system is that it is not necessary that there should be destitution before assistance is rendered, but, on the contrary, the city is able to prevent destitution falling to the lot of any honest citizen. For when through misfortune or loss of work the earnings fall below a certain standard, it is competent to assist those in need so as to raise their weekly receipts up to such standard. The city has carefully inquired into the matter of what this standard should be, and arranged a scale that, it is considered, is just sufficient to keep a person in the absolute necessaries of life. This scale is as follows:

	s.	d.
A man per week	3	0
His wife living with him	2	6
A child of 14 and over, if wage-earning ...	3	0
A child of 14 and over, if not wage-earning ...	2	3
A child aged 10 to 14	2	0
A child aged 5 to 10	1	7
A child aged 1 to 5	1	4
A baby in arms	1	0
In all for a family, if consisting of the above eight members	16	8

or a corresponding sum according to numbers and ages, whilst 3s. 6d. is the allowance made for any single adult.

Should a family find its income reduced to a sum less than equivalent to this allowance, then the almoner, if appealed to, will apply to have it made up to that sum. In urgent cases he may make a grant out of his own pocket, but ordinarily the case is brought before the district council at its next

fortnightly meeting, and there the matter is discussed and the amount to be given in aid fixed by vote of the members. The District President gives the money to the almoner, who distributes it to the family. Grants are made for the term of two weeks, and should a further grant be necessary the matter has to be brought up again at the next meeting, and so on from fortnight to fortnight. On an individual or family applying for relief, the almoner fills up a form with the name and full particulars of all the circumstances of the case, the amount advanced in aid, if any, etc. The contents of this form are copied into the books at the central office and the sheet returned to the almoner, who has to fill it up to date and submit it at each of the fortnightly meetings. On assistance being commenced, the individual or family receives a 'wage-book,' in which all earnings are to be entered by the masters and others who employ any of the members of the assisted family, and it is found that an employer seldom fails to assist the almoner by properly entering up this book; in this way the amount earned during the week is kept recorded and assistance regulated thereby. All available precautions against abuse are taken. For example, when a man, having lost his employment, presents himself for aid, his late employer is consulted as to the cause of his dismissal. Although no case must go absolutely unrelieved, yet non-genuine cases are gradually being made impossible.

With this system in vogue the dishonest poor, even of large towns, cannot draw upon indiscriminate charity simply by means of a well-varnished and 'text-interspersed' tale. For, in place of a number of haphazard distributions, the applicants find themselves confronted by an admirably organized system, which has all facts relative to civic poverty centrally tabulated. Moreover, as will be gleaned by carefully considering the sub-division of the Administration and the mode of holding the meetings, whereby the details of one district get reported to the others, such a system constitutes an efficient intelligence department in regard to its subject. Indiscriminate charity seldom aids the real sufferers, whilst it fosters a number of loiterers and impostors and a vast army of those who never do work and never would work for their living. These classes, it is clear, find it convenient to leave Elberfeld free to carry on the good work amongst those who can give a satisfactory account of themselves.

As at the fortnightly meetings of the several districts each almoner brings forward his cases for general discussion and settlement, so at the fortnightly meetings of the presidents of districts with the central Board of Administration each district president has to bring forward his report upon the work done and the cases under control in his district. At each meeting also two complete boards of almoners have to attend, and each member has to account for the people under his control. The

President of the Poor Council having carefully prepared his notes beforehand can minutely yet quickly overhaul every case under the immediate supervision of the almoners present.

Amongst the many excellent points of the system is the fulfilment of that essential condition of intimate acquaintance with individuals and facts. The helper lives in the district he supervises, and is, therefore, always near to the cases he has to attend to. The almoners are drawn from all classes; business men, professional men, shopkeepers, men of leisure — all contribute their quota to the excellent work, the only exceptions being the publicans, and the baker, butcher, and grocer, for these, being in intimate dealing with the poor, might be supposed to play into their hands.

In addition to the actual relief of the needy, this Administration carries out all sick relief. In every district—which, it will be remembered, is intrinsically small—is a doctor, paid for his services by the Central Poor Council. Needy patients get a ticket from the almoner and a further ticket for the chemist, if prescriptions have to be made up. The City Hospital, the Lying-in wards, the Orphanages, and the Asylums all go hand in hand with the central relief management, so that there is no overlapping, no means of drawing from two or three charitable societies, or of shamming illness and living from hospital to hospital, and no *raison d'être* either for begging or for the circulation of begging-

letters, the genuineness of which exists in but very few cases out of many. Moreover, the enormous proportion spent out of charitable offerings in mere administration is saved in this system of almonry.

Such careful thought having been given to the problem, its systematized working could have nought but beneficial effect. And it is found, after some fifty years of working, that the system has had a great and good effect upon the moral condition of the people. No man may starve under the system, but, on the other hand, no man can eat who will not work. If he is in need it helps him, but it also sees that he does his share of work, and the law of the country is behind it to see that he does work when work can be found for him. Methods of dealing with the constitutionally lazy show a far greater degree of efficiency and practicability abroad than here.* For, with us, hordes of the State-maintained

* In Switzerland 'work-shyness' (*Arbeit-scheu*) is the term applied to these nomads; and the efficiency of the system put into operation by the cantonal authorities in reducing vagrancy and vagabondship led Mr. Walter Long (President of our Local Government Board) to send a Commissioner to inquire into it. 'By the statute of 1850,' says the report, 'beggars and tramps are to be treated in accordance with the laws of the canton in which they are arrested, and those of foreign nationality are to be expelled from the country. The cantonal laws on the subject differ widely from each other. It may be said generally, however, that if an able-bodied man is without means, is genuinely in search of work, and his papers are in order, he will, on application, be supplied by the police, or by the Inter-cantonal Union (a private association under official patronage), with food and

roam the country, passing from workhouse to workhouse. These are their hotels, and so great is their intimacy with them, and so large the area of their peregrinations, that they can take counsel together as to which is the best hotel to stay at, and not only are they thus enabled to avoid those a little more expensive—in the labour bill—but they patronize, in embarrassing numbers, those industrial hotels which show them the greatest hospitality with the least irksome personalities.

The contribution towards temporary needs given in Elberfeld and Leipzig sounds small, but it is sufficient to prevent starvation; moreover, it has this

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lodging, and will, if possible, have employment indicated to him. If he cannot obtain any, he will be passed on to the next town, to a relief station, to his own district, or to the cantonal frontier. If he refuses work when offered, he is sent to his own district to be dealt with by its council; and if the council (who are responsible for the maintenance of their indigent citizens) decide that he is work-shy, he may be sent for a term varying from three months to two years to a forced labour institution (Zwang-Arbeits-Anstalt), which is in effect a house of correction for persons guilty of the less serious kinds of offences.

'But the police are empowered to arrest beggars without special warrant, and to bring them before a competent court, which may commit them to prison for a short term, or, in case of repeated offences and of refusal to work, may sentence them to from two to six months' imprisonment in gaol, or from six months to two years in a forced labour institution. It has to be remembered that the system of requiring certificates of origin and of discharge from work is in force in Switzerland, and facilitates the identification of professional tramps by the police.'

advantage—that whereas in England we contribute only when the recipient is absolutely destitute, in Elberfeld no man or woman is allowed to become absolutely destitute.

Thus the system possesses the further great merit of being preventive in its nature. The weekly allowance is not always given in cash; it is sometimes distributed, partly in tickets for soup or bread, and in this case the actual cost value of these is deducted from the money allowance. Clothes are distributed when necessary, and, as evidencing the practical nature of this distribution of charity, it may be mentioned that the under-garments so given away are made by the girls' sewing-classes of the elementary schools, so that only the cost of the material has to be paid for by the Poor Administration Board. In cold winters coals are distributed, but these are not deducted from the allowance, as they are generally bought from sums subscribed by rich citizens for the purpose, and handed on to the Poor Administration Board to see that such sums are properly spent.

Here we have again another great advantage of the system, for it provides a means whereby private charity may hand its funds to the public administration for a specific purpose, whilst the whole of the money subscribed is judiciously expended for the purpose intended, instead of a large proportion being swallowed up in administrative charges.

But the completeness of the system culminates in the work of the paid staff of the Poor Administra-

tion Board. The almoner deals with the case, suggests the amount of aid to be granted, receives it from his president after discussion at his District Board meeting, and distributes it. The president brings up particulars of these expenditures at the meetings of the central Board, and they are examined and passed, and the money grants paid over to him.

Each year the city pays over to the Board from its revenue a sum to cover its estimated yearly expenditure. This sum is distributed in the different districts by means of the voluntary machinery described, but the Civic Staff enters up against each recipient, from the forms already referred to, the amount he has received. Hence is available a complete record of the aid given to every person who has been under the charge of the Administration, with an account of the reasons, etc., why such aid was given.* This enables the authorities to see that the person so aided is really chargeable to the town. If, by law, he is chargeable to another town, it collects the sums expended upon him from that town, and if he has no apparent right of home in any town (this right is gained by two years' continuous

* Somewhat similar work is carried on by our Charity Organization Society, which in London has caused committees to be formed in every Poor Law district for improving the condition of the poor; such committees are in touch with the various other institutions working in the district, and records are kept of the charitable transactions taking place.

residence in a town) he is chargeable to the province, and, his subsisting distress having been relieved, the alien pauper is promptly transferred to the town or province he may belong to. Here one sees the national value of a Civic operation in preventing the abuse of charity, the aggregation of undesirables in districts lax in their administration, and the relief of the genuinely needy and deserving.

Another work of the office is to find if the persons receiving aid have any relatives whose duty it is to support them. In this it hunts up children or grandchildren, and makes them pay something towards the support of their aged parents; the amounts are small, and are fixed by the earnings of the person so called upon, but they have the good effect of showing that no one can shirk his or her responsibilities.*

* In this relation it may be desirable to mention that an Act has been passed in this year's Parliament (called the Prevention of Cruelty to Children Act, 1904) which extends the responsibilities both of the administrators of the Poor Law and of parents in regard to the protection of children. The first section enacts that any person over sixteen years of age, having the actual charge of a child, shall be held answerable for such child's well-being and comfort, and that without regard to relationship. If such person either assaults, neglects, or abandons the child, or causes it to be assaulted, neglected, or abandoned, the offence is to be a misdemeanour, and punished as an act of cruelty. With regard to actual parents, the excuse of poverty for not properly maintaining a child is to be inadmissible. If fathers or mothers have not the means to provide sufficient food for their children, they may not leave them inadequately fed or clothed, but must

A valuable feature of the organization, from the moral point of view, is that the help given is not looked upon as alms, and thus the recipient is not pauperized. Such help is considered a loan to tide over temporary difficulties—a loan which, if circumstances so change as to permit of it, should be paid back.

We know that, in regard to the honest poor, there are thousands of cases in which starvation is preferred to 'relief,' or the 'going on to the parish.' Those who may have manfully striven honestly to keep their heads above water may break down and become demoralized at the thought that they have not succeeded. But if they have the means of accepting temporary help from their fellow-citizens with the knowledge that on less hard times coming round they can repay their brother-townsmen, and find themselves again as independent as ever, the dispiriting effect is greatly lessened in the case of the right-minded, for they are not in the least called upon to feel that they have 'been upon charity' any more than a fellow-tradesman would have such a feeling had he borrowed temporarily from his neighbour in the course of business.

On the other hand, a great proportion of the

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apply for help to the parish. Perhaps the Act might have been more effective if it had thrown upon the parochial authorities the onus of taking proceedings in such cases; it is, however, suggested that they should do so when in their judgment it seems desirable.

poor have no such scruples, and injustice is done to the temporarily necessitous. As an example, it has recently been discovered by the Local Government Board that in the case of a town of 50,000 inhabitants, which shall be nameless, in a number of instances outdoor relief had been issued, sometimes for considerable periods, to deceased persons. Their representatives, usually widows, took it for granted that they were invested with legal heirship, and the relieving-officers appear to have adopted the same view. It is quite possible, no doubt, that in some cases relief was as much required as prior to the demise of the person to whom it had been granted. But from the standpoint of the ratepayers' interests, it is imperative that a practice so conducive to fraud should be suppressed. During the course of the inquiry it came to light that the local Guardians only devoted half an hour at their weekly meetings to the investigation of relief applications, by far their most important duty. In populous unions it needs not to be pointed out that it is utterly impossible for the work to be got through, with any reasonable degree of efficiency, at such express speed. And so there is a distinct tendency to revert to the slackness of the bad old times, when pauperized families lived, from generation to generation, on the rates, precisely as if they were hereditary pensioners of the State.

Finally, the workhouse of our English system has no place in this method, the dread of which ofttimes

entails so much suffering upon the part of the honest poor. There is the equivalent to our almshouses for those who are too old to look after themselves, and those crippled in health or intellect, and such of the inmates as can work are required to do so, but in as utilitarian a manner as possible—as, for example, the making up of the garments which are distributed by the helpers, and suchlike useful work. Moreover, the Poor Administration Board settles arrears of rent of those who die after having been in receipt of relief for some little time; in such cases the furniture of these people passes into its possession, and such furniture is lent out from time to time to needy folk.

Now as to the cost of all this. Looking back, it is found in 1853, with a population of 50,000 people, the expenses for poor relief alone amounted to 3s. 6d. per head; yet the poor and destitute were there, and in ever-increasing numbers. But no sooner did this system of Councillor von der Heydt get into working order than the expenses began to diminish and the amount of destitute poverty to vanish, until we find that now, with a population of 140,000 persons, the outlay on relief is only some 1s. 8d. per head, whilst the expenditure on poor patients in hospitals, the care of orphans and imbeciles, and the cost of the poor-house, amounts to 1s. 1½d. per head of population.

If we compare this with our English poor-rate of 7s. 9½d. per head of population for England and

Wales for the year 1902-3, and 15s. 8¼d. per head for the Metropolitan district of London* for the same period, one can see the enormous saving that could be effected; and to this also must be added the millions per annum which are indiscriminately scattered in private charities.

But do we pause sufficiently to consider the significance of these figures—this 7s. 9½d. per head and 15s. 8¼d. per head? It means that every year we pay away in England and Wales the enormous sum of *thirteen millions sterling* (£12,848,323) by means of our Poor Law administration for the relief of poverty—this quite apart from the millions with which it is supplemented by private charity. It means that in London alone the still more, proportionately, enormous sum of over *three and a half*

* The gross rate receipts of overseers and Guardians for 1902-1903 were:

London	£4,405,285	= 19s. 3d. per head.
Extra-Metropolitan Unions	£20,553,307	= 14s. 5½d. per head.

Or for

England and Wales ...	£24,958,592	= 15s. 1½d. per head.

But of these rates the expenditure on poor relief was for

London	£3,593,984	= 15s. 8¼d. per head.
Extra-Metropolitan Unions	£9,254,339	= 6s. 6¼d. per head.
England and Wales ...	£12,848,323	= 7s. 9½d. per head.

Commenting upon these colossal figures, some newspapers gave the cost per head of relieving our poor as 19s. 3d., but it must be borne in mind that the rate levied by overseers does not *all* go to the poor relief, and it is this that has led to the confusion of figures, some papers quoting the gross rate, whereas the others quoted the actual Poor Law expenditure.

millions' (£3,593,984) is paid out by us in regard to poverty. It means, moreover, that in the Metropolis, not alone every man, but every man, woman, and child must contribute a sum on the way to *a sovereign each* for the relief of the poor each year. It means that every respectable man who has spent a hard-working and useful life is called upon, during both his working years and those of his retirement, to contribute a very material sum towards the support of the lazy of his own nation and the outcasts of others, more usually and poetically but inaccurately put 'his poor and needy brother.' For example, a man earning £200 per annum as an average throughout his life would spend in house rental about £40 per annum; his house would be assessed at £30, and, in London, he would pay for poor rates £3 5s. a year. Of this £2 13s. would go in actual expenditure for the relief of the poor. Taking only the working years of such a man's life, he would have to contribute over *one hundred guineas* towards the relief of the poor—and things are getting worse. Surely the man is not only interested in knowing what proportion of the poor—to whom his money was handed over—were deserving, but he is justified in protesting against any of his money being paid for the support of the undeserving. Surely the time has arrived when the community are entitled to ask if that brother be *genuinely in need.* Surely we are entitled to ask in how many

cases we are helping *our* brother at all; or whether the individual be related to us not at all, but rather a relation of other nations unjustly foisted upon us. 'True charity begins at home,' for then we know whether or not we are effectively assisting those who are genuinely deserving.

Careful reflection will show that both our charity and our industrial modes—as also our fiscal system—call for careful revision. Other countries felt similar needs, and, as we know, attended to them; but we have not. However, Committees and Royal Commissions have been busy of late, and improvement may result. 'Considered as a system of public charity, which is the light in which the Committee regard it, the prevalent method in administering outdoor relief is altogether antiquated. There is little or no verification of statements. There is no sufficient indexing of cases, and therefore no systematic consultation of previous evidence. There is no definite plan of help, but only the more or less of an average allowance. What external aid there may be is not accurately ascertained, and is therefore usually ignored. There is no alliance with charitable persons or agencies who may already be giving aid, and may continue to do so. In these circumstances, adequacy—except in the sense of a larger instead of a lesser allowance—is impossible. And after the Board has decided what the allowance is to be, the supervision of the case from week to week and month to month is often most casual.

For all this the officers are not to blame. The system is faulty, and the closer investigation of the history and circumstances of each case which the Committee advocate will only be enforced when an altogether higher standard of responsibility is accepted by Boards of Guardians, and the whole method of inquiry is remodelled, and has for some time been constantly checked and supervised. With a view to a more careful administration in regard to relief for the aged, the Committee propose that in each union there should be a special Committee to deal with their applications.'*

Whatever antidotes may be suggested, it is safe to assert that the more artificial they be, the less likely are they to have any practical value. *Efficiency in reproduction* and *fairness in competition* are the two points which should, and must, be dominant. As to the latter, this, of course, cannot obtain under our time-condemned and entirely insular fiscal policy; as to the former, this cannot be attained, even in a small degree, whilst the policy of trades unionism remains as it is to-day. Indeed, the marvel is, in regard to both, how we have held out as long as we have—though it has robbed us of our former place of pride. But both can be altered. Both, however, require the education of certain classes of the community up to an appreciation of the national economics of production and the present international position in regard to them.

* C. S. Lock, *Economic Journal*, 1899.

On the point of artificial measures I will quote Professor Thorold Rogers: 'I am persuaded that an attempt to relieve distress, provide proper lodging, and find work for the inhabitants of large towns, would in the end produce even worse evils than that condition which the expedients would seek to relieve. No one disparages kindliness and charity. For certain calamities, such as those which are relieved in hospitals, they are indispensable. For extraordinary casualties they are invaluable. But as a universal process they would be disastrous, especially if the charity is compulsory, or provided out of the funds which the Government raises by way of taxation. To adopt such an expedient would be to despair of the recuperative power of honest industry. If the London ratepayers, or even the London landlords, are to find the means by which houses are to be provided for workmen at prices which are unremunerative to those who supply the homes, and work on products for which there is no market, or an overstocked market, it needs no particular acuteness to discover that the emigration into such towns will be more rapid than ever, and the restraints on improvidence, not now overstrong, will be entirely removed, and the old allowance system restored in its worst form. It seems plain, too, that in the end what was seen to be not very remote under the old Poor Law, will ensue, and *the relief of poverty will absorb nearly all the products of labour.*'

When one considers the appalling figures to which I have made reference, one realizes the feeling which more or less obtains that pauperism must be an acknowledged, and even acceptable, condition of life. But is this necessarily so? Or is it not rather an unhappy condition of things existent to-day, but capable—in regard to a nation having a better average remuneration, showing better educational results, and possessing a more perfect system of discipline—of material amelioration—a condition from which, indeed, a nation, by prudent control and observance of the effective factors in reproductive economics, might eventually work itself practically free?

It is apparent that poverty can only be dealt with in one of three ways: (*a*) by dole and the giving of money, (*b*) by the provision of work, and (*c*) by emigration. I have dwelt upon *a* and *b*, and will conclude by a word upon the last. 'In countries where emigration goes on largely from the best and most vigorous stock, and immigration into towns from poorer districts and foreign countries is active, it is inevitable that *helplessness, misery, and crime must increase.*' This condition, referred to by Professor Thorold Rogers, is irrefutable.

The prosperity of a nation demands the converse condition. In regard to an antidote for hereditary pauperism, the same student says: 'I am persuaded, from reason and experience, that the emigration of the young is the best remedy for hereditary pauperism. Some years ago, when

I was a guardian of the poor of my own city, my board took pains to carry out this kind of emigration, and with absolute success. Nor do I doubt that in London and other large towns, especially as education is sharpening the faculties and developing the intelligence of the young, such a system of emigration would be welcome and highly beneficial, especially if care were taken that the parent should be carefully and exactly informed of the way in which the child was going on, and the child was made to understand the duty of relieving the parent, perhaps of finding him or her a home in the new country to which he or she may have gone. The children of the poor are not undutiful or ungenerous to their parents. I am convinced from my personal knowledge that the wages of domestic servants are freely given by young women to their parents, and that the miserable earnings of agricultural labourers are constantly eked out by the wages of daughters in service. In the case of pauper children, I hold that they who have put upon others the charge of their maintenance have morally forfeited the right of determining their career, and that in the case of criminals and persons of infamous character, they should be, in the interest of the children, deprived of parental rights at once and altogether. It is to the interest of honest and industrious workmen that pauperism should be diminished as much as possible in the present and obviated in the future, and that crime should be isolated and watched. Everything

which increases the cost of administering humane societies, and still more everything which involves the waste of wealth, diminishes the resources available for the employment of industry.'

Now, this is, more or less, the enunciation of the principles of National Economics, but, as I suggest, the day has arrived when the isolate consideration of National Economics is useless—when everything requires to be thought out *inter*nationally. Let us see how, in this case, the aspect becomes entirely altered. The principle is, and must be admitted, that increase of poverty must result from pauper immigration. Yet those who so vociferously and loudly cry out for improvements in regard to the working man—their radical suggestions being invariably on impracticable and impossible lines—at the same time *oppose legislation directed to this end.* There are many things of such vital importance that they should be kept beyond the sphere of party politics; this probably will come with the millennium. It was certainly a pitiable spectacle to observe party feeling overruling common-sense, as it did in the opposition to the Government Bill introduced last session for the prevention of pauper alien immigration—a measure which other countries found it necessary to introduce years ago. It is, moreover, strange that either the one party or the other should introduce preponderating measures of industrial reform; stranger still that it should be the Conservatives

—in name only—who, as a perusal of the enactments abundantly shows, should have done by far the most in the alleviation of the lot of our working people.

But it is also pointed out that the best mode of elimination of hereditary pauperism is to send out of the country the children of the poor. Thus, internationally, under existing conditions we have the ludicrous spectacle displayed of the children of our own poor and non-workers being sent out of our country, to be immediately—*and in manifold degree* —replaced by those of the foreign poor and alien non-workers.

Lastly, it is pointed out that a most unhappy degree of emigration of our *desirables*, our best men, takes place. This, too, under present conditions is inevitable. The honest worker requires scope for his endeavours; he is entitled to all available opportunity for reaping the benefit of his energy and endeavour. That opportunity is denied him by British trades unionism, which prescribes a mediocre standard of workers, a uniformity of wage to indolent and energetic alike. To escape the disabilities and the thraldom, thousands of our best workers are for ever leaving our shores.

Now, reverting more particularly to our subject, it is obvious that in regard to our large towns the putting into operation of this Continental system, which has become perfected by half a century of continuous operation, would be a formidable undertaking;

but in the case of a Garden City, with its limitation in population and its commencement upon a 'clean slate,' the perfected system might, just as easily, be introduced as our imperfect one. The revenue derived from poor-rate taxation might be entrusted to a Board of citizens for efficient distribution by precisely similar machinery to that described, and the need—if any—for fresh legislation made clear, and the best mode of carrying it into effect demonstrated. Such an initiation might be made to form an effective object-lesson, and pave the way for the adoption of the system, possibly more or less modified, throughout the nation.

Preventative work in this relation is doubtless less attractive than direct alleviation, and it entails far more effort and serious thought. But, all the same, it is far more efficacious and of lasting value. If one but takes the trouble to carefully study industrial problems it is seen that, in our arts and manufactures, we suffer greatly from want of *standardization;* similarly, if we would but take the trouble to carefully study the matter of national poverty, we should see that Britain's need in regard to charity is *systemization.*

Interior of the Recreation Villa in a Garden Village in Holland.

AMUSEMENT AND RECREATION.

'Content can soothe where'er by fortune placed,
Can rear a garden in a desert waste.'

KIRKE WHITE.

THE very thought of a Garden City couples with it the picture of pleasurable amusement and recreation. For there are two ways of securing amusement: by the very artificial one of paying to be amused by others, and amusing ourselves gratis at Nature's expense. Not so in huge towns! Our vast and interminable erections of bricks and mortar are as an excluding rampart set up between us and the pleasures of Nature. In the din of town the voice of Nature is hushed. The artists of Nature—her flowers, her pastures, her trees, her skies—are inhibited from spreading before the eyes of the town-dweller her exquisite canvases of ever-varying landscape. To amuse ourselves in towns requires that we should be educated, sophisticated, grown-up; to amuse ourselves in the country we need but be—the children of Nature. To enjoy the town one needs to be able to conjure up the

changes of the past; to enjoy Nature we need only gaze upon the present, for she is ever changing. In a town we can see and understand all at one glance; the beauty—if such there be—lies on the surface. In a landscape we see at first an enchanting picture, but Nature's beauty lies in her detail, and life itself is not long enough for us to understand it all. Amusement is on every hand. Nature bids us recreate; there is a lecture in every field, wonder in every brook, contemplation in every cranny, lessons on every curve of hill and dale—a sermon in every stone.

How do the charms of Nature appeal to the cultured and the uncultured? Is there no differentiation? Nature to the latter is a delight because of the freedom they experience with her, because of the neoteric sensations aroused, because of her vernal influence and her brightness. The feelings of the cultured are inverse. Nature charms them through a sense of seclusion, of restful isolation; the sensation of novelty is replaced by a gratifying return to familiar haunts, quaint and quiet; the spring-like, ebullient influence by a desire for calm contemplation; whilst the charm of her colouring lies, not so much in the vivid brightness of her flowers, but rather in the reposeful merging of her softly-graded tones. But what of the moral effect? Here again is great discrepancy. With the uncultured, the exuberant delight may quickly pall; whilst pleasing the eye, it may fail to

appeal to the heart. Where one sees bright colour the other discerns exquisite beauty, for the mind is attuned to a more melodious *Klangfabre.* The one sees, the other *feels.* To one, the shaft of delight illumines like a sun-ray the sense of transient pleasure. To the other, the shaft probes deep down and touches the heart; it feeds the soul with manna from heaven. For we know, as Moore reminds us;

> 'The heart that is soonest awake to the flowers
> Is always the first to be touched by the thorns.'

How pleasant it is to hear people say they 'love the country'! One loves to hear a cultured woman say, 'I could not *live* without flowers.' The effect of these lovely painters of Nature is beautifully put by Ruskin: 'Flowers seem intended for the solace of ordinary humanity: children love them; quiet, contented, ordinary people love them as they grow; luxurious and disorderly people rejoice in them gathered; they are the cottager's treasure, and in the crowded town mark, as with a little broken fragment of rainbow, the windows of the workers in whose hearts rests the covenant of peace.'

I make this digression because I would desire the point to be considered whether the moral effect of the transference of the uncultured to new surroundings will be as efficacious as it appears to be assumed. I doubt it, for I feel, albeit Nature

speaks to the cultured, the ears of the uncultured will be deaf to her elevating influence unless the voice of the human teacher be heard by them. But herein lies a useful field of operation for the Women's Leagues of Garden Cities; it is to carry to their industrial units the appreciation of the beauties of Nature. And the task should be an easy one.

Imagine the influence of cultured women upon the lesser favoured in 'personally conducted' roamings in the verdant environs. Across the fields! 'The fields! Follow but forth for a little time the thought of all that we ought to recognise in these words. All spring and summer is in them—the walks by silent scented paths, the rests in noonday heat, the joy of herds and flocks, the power of all shepherd life and meditation, the life of sunlight upon the world, falling in emerald streaks and soft blue shadows beside the pacing brooks, soft banks and knolls of lowly hills, thymy slopes of down, crisp lawns all dim with early dew, or smooth in evening warmth of barred sunshine, dinted by happy feet, and softening in their fall the sound of loving voices.'* Consider what we owe to the country, its influence, and how it could be utilized. Imagine at the same time simple conversations leading to elementary lectures. Most important of all, the reflective and the reflex effect, when the strollers, without knowing it, become

* Ruskin.

pupils: the reflective, when these unmatriculated students begin themselves to ponder; the reflex, when they begin to discuss the wonders of Nature among themselves—when one shall say to the other:

> 'Learn this, my friend:
> The secret that doth make a flower a flower,
> So frames it that to bloom is to be sweet,
> And to receive to give.
> * * * *
> No soil so sterile, and no living lot
> So poor, but it hath somewhat still to spare
> In bounteous odours.'

At this stage the embryo floriculturalists will have entered on the threshold of true happiness; for they will have sown within themselves the seed of the most valuable plant the world contains—'sweet content.' And side by side with this will spring up another flower of inestimable worth—'Patience,' the worthiest part of all fortitude, and the rarest. 'Patience' 'lies at the root of all pleasures, as well as of all powers. Hope herself ceases to be happiness when Impatience companions her.'

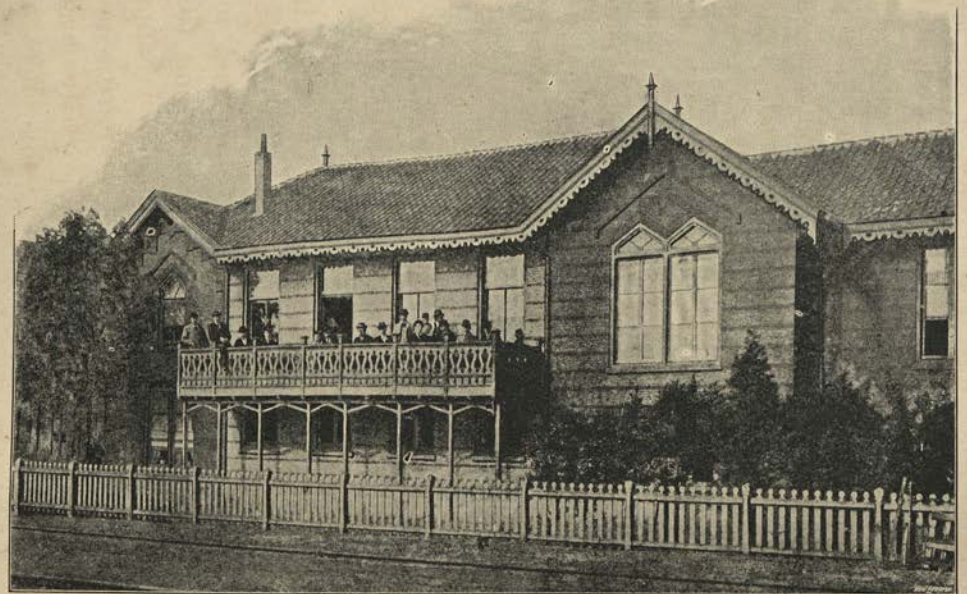
Patience, moreover, must ever adorn the bosom of the women who essay to do this good and all-important work—the sowing of content. Paradoxical as it may at first sight appear, to rear this flower it is often necessary first to sow *dis*content. Would we take a concrete example, we have it in the Duchess of Albany's scheme referred to.*

In that instance we have it demonstrated that

* See p. 612.

poor and ignorant working girls were exceedingly grateful for having had the seed of discontent sown amongst them. Erstwhile they had not known that their comfort could be so materially increased by their giving their attention to their clothing. They did not know that it was necessary for their health; they did not know what to do. Neither had they discovered that true happiness is to be found in sober pastimes. Theirs had previously been obtained through the maximum of noise and the zenith of vulgarity. Much that applies to the women also applies to the men. If our artisans could only be brought to reflect, they would at once see that in many ways their position is more enviable than that of many of the industrial units who are rightly classed as above them in the social scale. All that is asked for and expected in regard to the 'working man' is honesty, sobriety, and cleanliness, in each of which attributes he is, unhappily, in the majority of cases found wanting. Though he earn double the salary of many in the office, and has it well within his power, yet he exhibits little of interest in regard to his clothing. The bank clerk, on the other hand, is expected by all to dress as a gentleman does.

In touching upon home versus factory occupation I have drawn attention to the evil effects of the work being constantly within sight of the worker, and therefore persevered in at all times and hours. Unhappily, the wretched return avail-

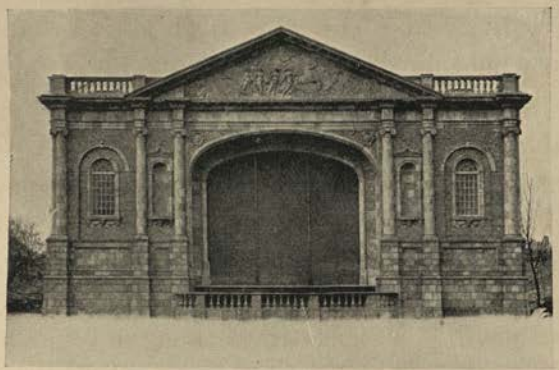


Recreation 'Villa' and Refreshment Room, Agneta Garden Village, Holland.

able from *quasi* unskilled labour, especially in the case of a widow or deserted mother with children solely dependent upon the results of her labour, and the hours during which their occupation is continued, are sadly greater than those allowable by the Legislature in factories. But this is hardly the worst; for whereas the factory worker ceases from toil from Saturday afternoon until Monday morning, the home worker not only works long hours on Saturday, but frequently continues her toil on the Sabbath. These are points which the opponents of factory labour fail to touch upon. But we have to ask ourselves, in the case of home toilers able to snatch 'the day of rest' from the domiciliary toil, 'What is the incentive to them to sacrifice gain by neglecting the opportunity to continue their work? What are the opportunities afforded to them by the narrow-minded, rigid Sabbatarian to leave their unhealthy hovels?'

Experience gained at the People's Palace in the East End of London and elsewhere has shown that the poor are keenly appreciative of good music that in this, at least, we have something to offer them which ministers materially to their happiness. Yet, be it said to the shame of the narrow-minded oppositionists, attempts to temporarily brighten the hard lot of these workers by this effective and innocent means have been hitherto vehemently opposed, and the good work of the more far-seeing thwarted. Happily, in spite of this, the National

Sunday League has, under great difficulties, for thirty-five years—a period much longer than otherwise would have been necessary—carried on, under the title of 'Sunday Evenings for the People,' a gradually extending scheme of innocent entertainment for the working classes. To persuade the straight-laced that a day of rest might, with advantage, be partially spent in listening to agreeable music, and that benefit to the hard-working must inevitably accrue from change of interest and occupation, proved for long a very difficult matter. However, the League fought valiantly on, with the laudable object of suppressing their dull Sundays, and at length success has been achieved. In the concert-halls of London, which formerly had had their doors kept locked, and to prevent the beneficent opening of which the opponents to whom I refer had had recourse to every scheme ingenuity could suggest, prosecution after prosecution following upon the unearthing of obsolete though not repealed Acts of Parliament—in these concert-halls we now have the gratification of seeing assembled, listening with unalloyed delight to soul-inspiring melody, the like of which they had never known, vast assemblages of the workaday world. *Now* in our parks many thousands have their pleasures ministered to by the same elevating means on Sunday afternoons and evenings, comporting themselves the while in a manner at once orderly and self-respecting, and absolutely falsifying



Al-fresco Auditorium in the Garden Village of Port Sunlight.

An Eastern Al-fresco Theatre.

the predictions of those morose opponents of relaxation from labour who had prophesied that the enjoyment of the people would manifest itself in roystering and rioting. On the contrary, the fact has been demonstrated that the behaviour of those who attend these Sunday concerts, both in West and East End of London, bears favourable comparison, in politeness and consideration, with that of more fashionable throngs. Far from the effect having been demoralizing, it is demonstrating continuous improvement in self-control and orderliness. The last season's work shows further extension in the operations, the number of halls and theatres thus utilized having been increased from sixteen to twenty-one, whilst the number of concerts given amounted to close upon five hundred.

The pleasure-affording influence in this common-sense movement may be gauged from the fact that during last season the audiences aggregated to no less than 631,880, an increase of more than 30 per cent. upon the previous year. I have elsewhere referred to the wretched condition of the poor of great towns on wet Sundays; their only alternative to trapesing the slushy streets is the public-house. By the work of the National Sunday League, in place of this many thousand workaday folk now find comfortable seating and pleasurable, elevating entertainment in London alone. Even in this the disadvantages of a vast metropolis become apparent; the distances to be traversed

are so great as to practically prohibit many thousands partaking of the enjoyment, whilst it calls for expenditure upon the part of those it is desired to benefit, and, moreover, entails additional Sunday labour in regard to their transport.

With an awakening to a more rational and efficacious means of elevating the workaday orders, it may be safely anticipated that the orchestra of Garden Cities may not remain mute on the day of rest, that the inhabitants may be seen circulating about it in their thousands in the open air, and that the doors of their concert-rooms may be flung open not only to afford shelter in inclement weather, but to dispense chaste melody to those who, by reason of their elevating environment, may be able the more thoroughly to enjoy and reap advantage from it on their day of rest.

From amusement on the day of rest to workaday amusements the step is short; but in regard to the latter I would like to add a remark with the view of preventing the repetition of an error which in this connection has already been fallen into. Just as it is necessary to '*thoroughly understand the material to be beneficially worked upon*,' so is it of equal importance to adjust amusement and recreation to the taste and capacity of those for whom one is catering. One must not forget that socio-industrial problems have perhaps received more consideration, and certainly have had carried to them more practical advance, abroad than with

Music in a Continental Garden Village.

Boys' Band in a British Garden Village.

Grouped Cottages and Library—Port Sunlight.

us, and therefore we would do well always to give an eye to developments elsewhere; and there is not wanting evidence that elevation by gentle gradation has received careful consideration. I will mention an example by way of analogy. In connection with one very extensive industrial concern in the United States, where the whole 'Ville' is more or less dependent upon the huge factory, the proprietors have introduced a very successful means of elevation by the inauguration of a perambulating library; and in connection with this they have sought to elevate artistic feeling, a process which they have appreciated could only be accomplished by slow degrees. To this end they issue, by means of their perambulating library, simple works of art; these are left on loan at the dwellings for the period of one month. And it is in connection with these they have sought to attain their object by means of gentle gradation. Thus the pictures at first issued are of somewhat crude and bizarre nature, of that type, indeed, with which the recipients delight to adorn their walls. By imperceptible increment the artistic tone of these household embellishments is raised, and this, taken in conjunction with the art instruction given in the evening classes, gradually leads up with it the popular taste, so that the delight becomes transferred to things of greater and higher artistic merit. At present the workman's home is principally decorated by cuttings

from the illustrated papers, and by the more or less gaudy almanacs of the shopkeepers. The enormous strides which have recently been made, however, in the economical reproduction of works of art have now placed exceedingly pretty and higher-class pictures within the reach of the artisan, and they will doubtless appear upon his walls as soon as his taste has been improved to the extent of enabling him to appreciate them.*

In the light of the *rationale* of this, one appreciates the stupidity and short-sightedness of offering to a certain class amusement of an order of refinement out of harmony with it; for in that case not only will the attainment of the desired end fail, but a measure of disappointment will be imparted where pleasure was intended. For failure to appreciate the feast spread out will carry with it

* The advances which have been made during the last few years in colour-printing, by which really artistic public advertisements can be produced economically in place of the hideous and garish things of a score of years ago, should cause municipal authorities to make by-laws to control the advertisement posters by which our towns are embellished or disfigured. But beyond this, we are sadly in want of an Act of Parliament to prevent the land being disfigured with advertisement boards, which in the country offend the eye more than in towns. At present these hideous excrescences are the work of a few firms who find it necessary to advertise their nostrums, and it is scandalous that to enrich these few the country should be disfigured. It may be that the land is private property, but I contend that the landscape is *public* and national property, and the nation should be able to control and protect its own possessions.

an adverse moral effect, from the realization upon the part of the recipients that they are unable to grasp and understand it. Obviously, then, ever though at the first it may jar upon the more refinec ear of the organizers, it will be better if such amusements are at first pitched in a somewha too low key, so long as the principle of elevatior by gentle gradation be provided for.

Bearing upon the mode of life, the following remark, made by the original author of the Garder City movement—J. S. Buckingham—made in con nection with his proposed City dealt with in th previous volume, is as apposite as it is interesting seeing the number of years that have elapsed sinc it was written : 'If we pass upward to the highe grade of shopkeepers and retailers of manufacture goods, the irksome confinement which these undergo from an early hour in the morning till late at night with only brief intervals for food and sleep, bu none for recreation or instruction, subjects then to daily exhaustion, and when almost the only holiday throughout the year arrives—the Sabbath —they are often too weary by the week's confine ment and labour to enjoy it with that vigour an freshness which can alone make it a day of pleasur able devotion or of healthy exercise, for both o which it was evidently designed.'

Applying this to the City, I have ventured t delineate, it may be added, that the ill-effects o

home labour are discernible principally in regard to the shopkeeping classes who live at their places of business, and it was this, amongst other reasons, I kept in view when I made the suggestion that the better-class shops of Garden Cities should be 'lock-up' shops, arranged in the form of a colonnade, and that their owners should live away from these in their private dwellings, each supplied with its garden of proportionate size.

Recurring to the poorer classes of the community, it would be difficult indeed to elevate by means of school or class room, and to inculcate feelings of refinement, were the conditions of home utterly demoralizing, as unhappily they so frequently are. How can one expect refinement in either conversation or manners when whole families are huddled together in a room irrespective of sex? This state of things usually arises from need, but care must be taken that it be not brought about by love of gain. For it has been found even when dwellings of ample capacity have been provided—as, for example, at Port Sunlight—that overcrowding will still take place, the occupiers being but too ready to sacrifice health and comfort for money-making by means of lodgers; hence proper limitation has to be enforced.

Again, it were almost idle to endeavour to inculcate system and habits of tidiness if want in resource of the dwellings be such that the tenets of such instruction cannot be carried out. I refer

to small matters of great importance too often wholly neglected. In this relation it may be interesting to point out—due without doubt to the practical training in domestic affairs insisted upon by her late Majesty — that H.R.H. the Princess of Wales, in inspecting recently blocks of workmen's dwellings, thought to be, perhaps, the most perfect of their kind, pointed out their deficiency in regard to cupboards. Without cupboards there cannot be tidiness, and without tidiness, Richardson has taught us, there cannot be health. It is obviously necessary that something in the nature of adequate larder accommodation should be found. In the report of certain inspectors is to be found the following remark: 'Of the fifty-nine homes inspected, only nine could be said to possess proper accommodation for the storage of food. We frequently find a family's whole stock of perishable food fully exposed to the attacks of flies, which always seem to patronize chiefly the baby's milk, especially if it be of the condensed and sweetened order. A more sickening sight can scarcely be imagined.' The danger attaching to flies will be apparent when it is remembered that dust-holes and refuse-heaps are their breeding-grounds and natural habitations. It is well known to scientists that the legs of flies are especially adapted for carrying micro-organisms from place to place. There can be no doubt that the provision

of a suitable larder to each tenement should be insisted on.

Let us assume that by means of a Garden City apposite dwellings were *in este*, that in them the visits of educated women were welcomed; then the battle would have been half won, for then the reflex action would have set in. 'Domestic pride' would beget emulation; 'the pleasures of home' would be discussed by the few and sought after by the many. The cultivation of order in the home would lead to the desire for order in the person. Self-culture would be sought after, and the efforts of evening class instruction would rapidly fructify. The enjoyment of 'music in the park' would arouse the desire for 'music in the home,' and music is the hand-maiden of happiness. Music and discord cannot live in the same breast, and were we able to inculcate a true love of melody and harmony among the masses, we should be spared the distressing spectacle of the depravity of their mode of enjoyment.

In the foregoing remarks I have perhaps had in my mind more particularly the women workers. The delights of a town-country life for the lads and male workers generally needs not to be expatiated upon; and sport as a manly mode of developing wholesome emulation and competition cannot be too highly commended. But the excessive love of sport by the average Britisher is really becoming a matter of some gravity, when viewed from the

industrial aspect. Thus we find that the exceedingly unmanly occupation of 'looking on at football,' which, seeing that it now commences at the end of August, has been facetiously referred to as our national summer sport, is having a disastrous effect in regard to some of our factories. For we find that on certain days, and almost regularly on Saturdays and Mondays, work in the factories is disorganized by the absence of the bulk of the employés, who are engaged elsewhere in the unmanly occupation of watching a manly game. The sport has become more or less a business, for the contestants are paid, like the gladiators of old, to minister to the excitement of multitudes assembled around the arena. Fifty per cent. of such onlookers are in bodily vigour fitting them to obtain their excitement in the more manly manner of themselves taking part in exhilarating games. And this applies to both sexes. In regard to the working-man, it is surely time to endeavour to infuse within him due appreciation of the difference between work and sport, and that he is neither justified in wasting his time and sacrificing his earnings, nor in dislocating his master's business, merely for the purpose of gratifying a lazy form of pleasure-taking. Every facility should be given to him for participating in the health-giving pastime, but he should enjoy the game for that purpose, and for that alone.

From the calculations I have elsewhere given

concerning the cost of providing sports grounds, one sees how advantageously Garden Cities would be placed for carrying this into effect. For there not only could ample recreation grounds be provided, but the sports could be conveniently indulged in during out-of-factory hours. Children would at an early age be inducted into wholesome competition in regard to athletic pursuits and health-giving outdoor play. Instead of the gutter, the poorest child would have the garden; in place of the foul sight and smell of unwholesome garbage, he would have flowers and greensward.

I have elsewhere dealt, in the most forcible manner I could, upon the fatal proposition that equality should reign paramount in these newly-constituted Cities. In regard to sport, as in regard to almost everything else, the infusion of every class as we have it throughout the country cannot but prove to be highly beneficial. The wealthy sportsman, where sport is concerned, lays aside his reserve, waives the distinction of rank, and enters with zest into the honest enjoyments of common life. Such amusements knit the two classes closely together. The bark of the hound and the sound of the horn blend all feelings into harmony. The excitement of the chase breaks down all distinction. The country parson gallops along beside the church-abstaining parishioner, the Earl beside the sweep—all in one joyous friendship cemented by the exhilarance of sport. And who shall say that this

has not an elevating influence upon the lesser favoured? Are not some of the angularities rubbed off from the demeanour of the little 'caddie' as he trots along beside the long-legged golfer, wondering alike at his familiarity and kindly bearing? Sport has manifold advantages—it knows no politics, it is all-levelling.

There be those, unfortunately, who from physical causes are unable to participate in the brusquer types of amusement, and here again the Garden City could hold out inducements and facilities for amusement of milder *genre* in the delightful occupation—suited to young and old of both sexes—of gardening. For such work prizes should be offered for competitions not only in the production of the finest specimens of fruit, vegetable, and flower, but also for the best-kept premises, the trimmest gardens, the most effective mode of window-box gardening, and such-like. Having dealt with this somewhat fully in the previous chapter, I will here only add that, so potent for moral influence was gardening considered to be by that eminent statistician and advocate for temperance, Edwin Chadwick, that he strongly urged it as an antidote in connection with the Drink Problem.

We all know Izaak Walton's high opinion of the moral influence of the 'gentle art.' How to carry this close to the doors of the dwellers in Garden Cities would seem to give scope to much ingenuity, similar to that of the Americans who, at Cleveland,

Ohio, have contrived to pack six miles of excellent trout-fishing into 104 acres of ground. There, within these very narrow limits, the six-mile stream twists and turns, affording 'cunning eddies and seductive pools.' Yet so well is it supplied with dainty little foot-bridges that the sportsman is always within easy reach of his club-house.

Regarding evening amusement nothing need be said; it can be safely left to the class of women who pay those beneficent domiciliary visits; to the class of men who delight to minister to the happiness of youth. In this connection I would only say that just as in the business of life the most valuable teaching is that which points the way to self-help, so, in regard to recreation, the most effective teaching will be that which teaches people to amuse themselves in self-improving fashion. And in this relation stress should be laid upon not only the choice of friends, but the disadvantages attendant upon never being alone. 'Might I give counsel to any young man, I would say to him, Try to frequent the company of your betters. In books and in life, that is the most wholesome society. Learn to admire rightly; the great pleasure of life is that. Note what great men admired: they admired great things; narrow spirits admire basely and worship meanly.' To this splendid advice of Thackeray I would venture to suggest the value of cultivating the art of being content with one's own company. For without

seclusion there can be no meditation, and without meditation no great idea can be evolved. George Stephenson, had he been able and desirous of nightly attending concert or class room or debating society, would never have revolutionized the locomotion of the world. It was as he sat in his little cottage mending the clocks of his neighbours, or, chalk in hand, teaching himself to calculate, and in sitting long hours close beside the slowly-swinging beam of the colliery pumping-engine, that his thoughts became concentrated and his ideas took concrete form. Let them, moreover, be impressed with those virtues which play so important a part in life's friendship—sincerity and kindness of heart.

> 'This above all—To thine own self be true;
> And it must follow, as the night the day,
> Thou canst not then be false to any man.'*

Towards others their guiding maxim should be, especially in regard to sport:

> 'Never to blend our pleasure or our pride
> With sorrow of the meanest thing that feels.'

With human beings kindness, though it so ofttimes does no good, can never do harm. In this we ourselves fall short of the animal world. Perhaps we do not pause to reflect the effect kindness has had upon evolution. Our ancestors showed kindness to animals in order to enlist their assistance, at first in the chase, and subsequently as fellow-workers; the effect of their kindness did

* Shakespeare.

not die with them. Not only have we reduced the number of our natural foes, but to-day we have them as our companions and helpers—our horses and our dogs, true types of devotion to duty, superhuman examples of gratitude and affection, emblems of sincerity and unalloyed loyalty. Quadrupedal friends whose instincts, erstwhile limited to bellicose necessity in the fulfilment of the law of self-preservation, have to-day become not only our friends, but our protectors.

The more we travel, the more we make acquaintance with the orderly manner in which the workaday world takes its pleasure upon the Continent, the more we appreciate our own shortcomings in this respect. Has any reader ever witnessed abroad—were it in France, Belgium, Germany, Italy, Sweden, or Norway—anything comparable with the demoralizing effect of the British 'bean-feast,' when strings of pleasure-vans pass one, crowded with semi (or wholly) intoxicated beings, most of whom have performed the to them mirth-inspiring transition of the headgear of one sex to the dishevelled and fuddled cranium of the other? Music (*sic*) there is in all too ear-jarring abundance! but it is confined to the maudlin rendering of morbidly lachrymose songs, drawled out of tune with the brazen, blatant blast of an ill-played cornopean. 'The British take their pleasures sadly,' say our trans-Channel neighbours. However this may be, it is obvious they are sadly

deficient in how to do so happily, so as to bring joy to themselves and pleasure to others. It is true that on gala-days abroad one may join in a harmless revel, but to the British working-man every 'outing' is a gala-day and revel. The Briton prepares himself for one great 'outburst'—or, as they put it, 'on the bust'—of pent-up hilarity in the country on predetermined occasions. The Continental workman, on the other hand, spreads out his pleasures throughout the year. Every Sunday is a day of recreation to him—nay, every evening finds him sitting in the nearest park or open space—and it is truly surprising to see how every available scrap of space in the open air is utilized—sipping his claret or quaffing his almost harmless 'lager,' whilst our men are standing, crowded together like cattle, in hot and reeking public bars! Thus, whilst one feels the necessity of periodic ultra-urban flights, degenerating to orgies, the other has no such need.

It is very remarkable that our Metropolis should be so far behind our provinces in regard to holiday-taking where, by means of the holiday clubs to which I have referred, they take a spell at the seaside in a manner analogous to the holiday-taking of those above them in station in life. The contrast of our methods and those of the foreigner was forcibly brought home to my mind while in Switzerland recently. Long before their holidays come round the Switzers subscribe and

band themselves together for a happy pedestrian tour among their mountains. Such expeditions are properly and most carefully plotted out and arranged for, and their journeyings include such distances for the diurnal goings of these stalwart men as would simply appal the Lancashire mill hand, the Staffordshire smith, or the London clerk. Unlike the demonstrations of happiness (*sic*) of English bean-feasters, the Switzer tripper's relaxation and pleasure gives pleasure to others, for it takes the form of singing—trained and very *credibly* executed.

At ancient Thusis I had the pleasurable advantage of coming upon such an *Ausflug*. No less than forty sat down to mid-day dinner—a right merry dinner with much toasting, but no vulgarity. Of the contented forty, no less than thirty took part in glee-singing. This array of stalwart mankind formed up in a semicircle, whereupon a tall and upright, long-necked, closely-cropped figure—they all crop close before starting on an excursion—stepped forward as conductor. His deeply-bronzed face and horny hands peeped out incongruously from a 'Sunday' suit of neat blue serge as he stood before his thirty, conducting with nothing more obtrusive than a short pencil. A few held books or paper score, but he eschewed both and himself sang as lustily as the rest. The type of song sang revealed the sentiment of the singers. They sang of their 'beautiful Switzerland—their

home'; and when, in canon, the stentorian basses melodiously asked, 'Will you mount with us to the high peaks of our Alps?' conductor and tenors gleefully rejoined, 'Willingly, willingly will we go.' A pretty madrigal, 'The Old Sweet Dream,' which was about the tranquil mountain home and the staunch Frieda waiting there, gave an opportunity for that fine Alpine *diminuendo* effect in which the splendidly deep base is the last voice to die away, leaving that spell of satiated pleasure which is alone produced by the long-necked, deeply-set larynxed Switzers and Tyrolers.

Would that our workers cultivated voice and song and pleasure in the singing! Imagine forty British workmen rising from *their* bean-feast and their pewters of 'four-half' to sing a glee or madrigal, correctly and with feeling, enjoying and imparting enjoyment to others, elevating and refining themselves! Those who may have 'assisted' at such annual functions will, one fears, say they *cannot* imagine it.

Dinner, dessert, and concert discussed, I observed the merry Switzers divesting themselves of their collars and cravats—Swiss *ouvriers* wear such things—and replacing them by silk kerchiefs neat and clean. What could this mean? fisticuffs or skittles? Collars, cuffs, and cravats were wrapped in paper, and I watched to see where they were to be stowed. Following a lithesome Switzer into an adjoining room, I found ranged along the

walls forty serviceable goatskin knapsacks, into which these concessions to etiquette were safely deposited ere the vocal pedestrians strapped knapsack on back, glad to be rid of such restraining neck apparel as they trooped down the staircase *en route* to Andeer for tea and Splugen for the night, to be followed by a glorious tramp over the Alps by St. Bernardino, and back by the St. Bernard to Basle.

They flaunted no garish banderoles, they flourished no brazen trumps, yet they swung along to an inspiriting march from their own conveniently portable instruments. A few minutes later, Gretchen, richer by several francs, might have been seen wending her way to the post-office with at least 150 of those pretty souvenir post-cards, going in advance to tell of their happy visit.*

The ever-increasing speed and press of town life makes it the more necessary that frequent excursions should be made into the country. How much better would it not be if, instead of the Bank Holiday and beanfeast day—when half the time is spent in getting out of, and again in returning into, the great Metropolis—our London artisans would arrange amongst themselves such pedestrian excursions as I have described in regard to the Swiss, to extend over several days, as, for example, from the Thursday of Good Friday week to the

* More concerning Swiss manners will be found in 'Across the Great St. Bernard,' by the author.

night of the Bank Holiday following. Of late years our railway companies have offered continuously increasing facilities for circular tours to be made by cyclists and pedestrians. In regard to these, it is noticeable that such railway inducements are more numerous in connection with provincial towns than with the Metropolis. This arises from greater advantage being taken by workpeople of such facilities, and this, again, is due to the fact that the organization of the operatives in regard to holiday-making is more perfect than it is in London, often, indeed, enabling them to charter special trains for their conveyance.

It is inherent to large towns that considerable difficulty and expense must attend the enjoyment of rural delights. In towns of the class we are discussing these disabilities would be removed, and I am persuaded that at the same time the coarseness of working-class amusement would also be largely removed, to the great benefit of our working classes. Habit, combined with ignorance and want of self-respect, has caused the once picturesque language of large sections of our working orders to become the most debased and filthy the world has seen. The conversation of the average British labourer is one continuous repetition of filthy and sanguinary expletives, a volubility made up of redundant and wholly useless adjectives. Strange that such utter waste of time and energy should be expended in this manner by our labouring classes.

It is, of course—and in fairness this should be pointed out—confined to classes. One may visit works such as building operations, and there be disgusted by the foulness of converse; on the other hand, one may visit technical institutions in the evenings, crowded with workmen desirous of making headway in the world, and there be delighted with the purity and intelligence of the conversation.

Taking into consideration the *buying capacity* of money in Great Britain, the British artisan is the best paid in the world. What he is deficient in is the knowledge how to spend it. This arises fundamentally from the innate incapacity of the average working man for efficient thrift. He needs to learn this, and also how to spend his earnings in suchwise as to produce the maximum of happiness for himself and his family. The most cursory thought will show that in towns of limited populations and superior organizations, such as Garden Cities are intended to be, the facilities for efficient, economically obtained, and elevating amusement and recreation will be very great.

A Garden Village Hostel.

TEMPERANCE

If it be asked, 'What is the greatest curse of modern civilization?' there can be but one reply—Drink. This is the conviction of every thinking person. Every conscientious citizen of the Empire, every well-wisher to his country and race, feels as if besieged, engirdled, hemmed in within an imprisoning wall of deleterious usage and custom, looking in vain towards the ever tightening cincture of the invader only to find it all but impenetrable. In anguish he cries, 'Is there any means of escape?' There is, perhaps, no other subject more seriously weighed, considered, and debated; there is, perhaps, no other problem the solution of which at present appears more obscure. The problem is too difficult for adequate discussion in these pages, but all must feel that in connection with the suggested type of towns under consideration a unique opportunity has arisen for local amelioration and for the introduction of example-setting reform.

How will this grand opportunity be seized upon? Will it be sacrificed to narrow-mindedness? Will it be lost through overbearing exercise of command unexpectedly vested? Will drastic modes vitiate

the ends? Will it be *example-setting?* These are questions that will be asked—and not without a measure of anxiety—by those who are eagerly looking for the rift in the python-like ceinture—those who, unhappily, must feel that without the seizure of some such opportunity they cannot hope to see the day of effective amelioration.

The curse of intemperance is of momentous and ominous import, whether it be viewed from the social or the National aspect. And although the former view appeals to us most strongly, seeing that intemperance is synonymous with misery, degradation, and crime, still, the two colossal influences cannot be separated.

The gravity of the National aspect is, perhaps, brought home by the reflection that at least one-sixth part of the family income of our working classes is spent in alcoholic liquor. Time was when we were the manufacturers for the world, when, our spending capacity surpassing that of all others, we might have been in a measure justified in a high rate of self-indulgent expenditure. But now things are vastly changed; we are now in keen competition with all the world, and as a nation must be disastrously handicapping ourselves when our working classes annually spend two months' earnings in drink.* Socially, such expenditure is even greater,

* The national drink bill of 1903, prepared by Dr. Dawson Burns, shows a total expenditure last year on intoxicating liquors in the United Kingdom exceeding one hundred and seventy-four millions (£174,445,271). This represents an average outlay per head of £4 2s. 4d., and per family of five persons of £20 11s. 8d.

and vastly so, seeing that it is accompanied by a huge waste of time as well as bodily vigour. Such expenditure, moreover, is a sad retarding element to social advance and progressive civilization.

Unhappily, despite the loud outcalling of temperance reformers, we to-day in Great Britain have little or no evidence of any really practical scheme of reform. 'Experiments' are spoken of and called for, but even in regard to these all eyes appear to be turned towards the Legislature for assistance, whence, having regard to the intricacy of the problem and the fact that it turns upon human frailty, there is little to be expected.

It is assumed by most temperance reformers that a reduction in the number of public-houses would be fraught with beneficial results. This is a frail reed upon which to lean, especially in face of the fact that it has already been negatived by the result of previous reductions; for one finds that, while the number of 'on' licenses (*i.e.*, public-houses and beer-houses) in the United Kingdom has declined from 3·7 per 1,000 of inhabitants in 1882 to 3 per 1,000 in 1902, representing a *decrease of* 19 *per cent.*, yet, instead of a corresponding decrease, the con-

For the preceding year (1902), a more prosperous one, it amounted to nearly one hundred and eighty millions (£179,499,817). It is computed that only about one-half (55 per cent.) of the population were accountable for the entire expenditure, and it is further considered probable that two-thirds of the total expenditure was contributed by persons whose annual incomes did not exceed £150.

sumption of alcohol per head of population has *increased by* 12 *per cent.* Again, in regard to the Metropolis, we find that in thirteen years—*i.e.*, between 1890 and 1903—the number of 'on' licenses (public-houses and beer-houses) in the County of London has declined by no fewer than 552, representing a *reduction* of 7 per cent., yet the consumption of alcohol *per capita* has materially *increased.*

Taking a broad view of the subject, I feel there would appear to be but little justification for hope that reduction in the number of public-houses would result in any material diminution in the abuse of alcoholic liquors. It must be admitted that drink is taken for one of four reasons: to slake thirst, for conviviality, for the love of the thing, or from inherent weakness for dram drinking. Now, I aver that in either case the effect of putting it a little farther out of reach would result in but the most infinitesimal reduction in the quantity consumed. The quantity of spirituous or alcoholic beverages drunk depends on many factors—but principally upon the spending capacity of the community—and of these factors one of least importance is the number of counters over which it is dispensed.

Let us consider the case of any one of our large towns, and assume that one-half the licensed houses were swept away. What would be the effect upon the inhabitants of that town? Simply that they

would have to go a little farther to their houses of call. Reduce the number to one-fourth, and similar reasoning will apply, for the reason that no change will have been wrought either in the habits or desires of the inhabitants.

Let us turn from the towns to the villages. The village contains, let us say, four inns, and we reduce the number to one-half. Will that have the slightest effect in decreasing the amount drunk each evening? It is most unreasonable to expect that it will—nay, have we, *under present conditions*, any right to expect that it should? What—we must surely be reasonable enough to ask ourselves this question—was that village inn, or its predecessor, set up for? For the purpose of providing men with beer or other refreshment, will be the reply! But that is but a partial answer! It became a kind of inn because it fulfilled a social want in providing a place where men might meet and rest and engage in convivial intercourse. Any other of the wayside houses might have done the same—subject only to the common law in the case of it being the scene of disorder. In its early history the ale-house became subject to statutory restrictions for police purposes, and subsequently we find such places of resort divided into two classes—inns (or hostels), and the ale-houses and victualling houses. And this brings me to the point I desire to emphasize. In such establishments—whether rural or urban—a measure of comfort was provided for. In them were to be found forms

and settles, high-backed chairs, stalls, ingle-nooks, a capacious chimney, and—of paramount import to the comfort of all—a ruddy fire of wood and later a blazing one of 'sea' coal. But beyond this, provision was made that each *habitué* might cook himself a meal. Many were there who could but afford a penny or so for his 'jack' of foaming small-beer and 'crust of bread and cheese.' But was not that penny well spent? Did not the weary traveller and the tired land toiler get good return for his expenditure? He felt not an outcast, but rather that he was welcomed 'neath that roof of frugal hospitality. Maybe in the chill fields next day his thoughts oft turned with glad expectancy to the warmth, comfort, and sociability of the coming evening's reunion. What have we to offer to-day in place, when every country inn is being 'modernized'? What has the temperance reformer to offer in compensation when he cries, 'Away with it'?

Turn we now to our towns. Sunday morning—a raw December day, sleet falling drearily through an opaque, spirit-depressing fog. A decent working man—we still have some—is sheltering beneath a wall—he is single, and hails from a 'doss'-house—watching a 'pub,' longing for its doors to open. At last!—and what a reception! A bare, cold counter, a brusque barman. To the bar he elbows his way, gulps down a 'pot' of *strong* beer upon an empty stomach, is promptly elbowed away again. The doors are banged: he is again an outcast to roam

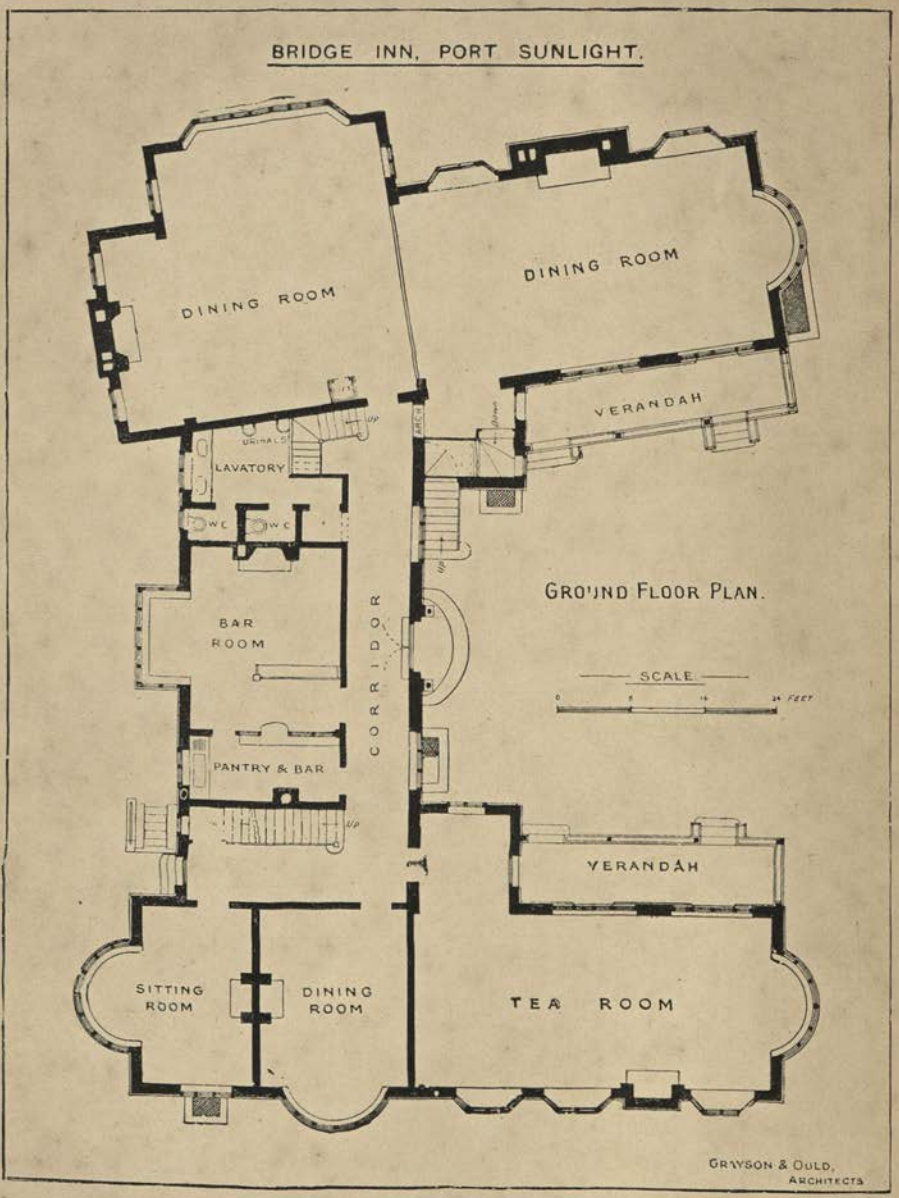
The 'Bridge' Inn—Port Sunlight.

the dreary, deserted thoroughfares till evening. Then comes his opportunity, for he can again drag his limbs, chill and damp, to the same 'hostel,' gulp down more strong beer or spirit to drown his misery —and get locked up.

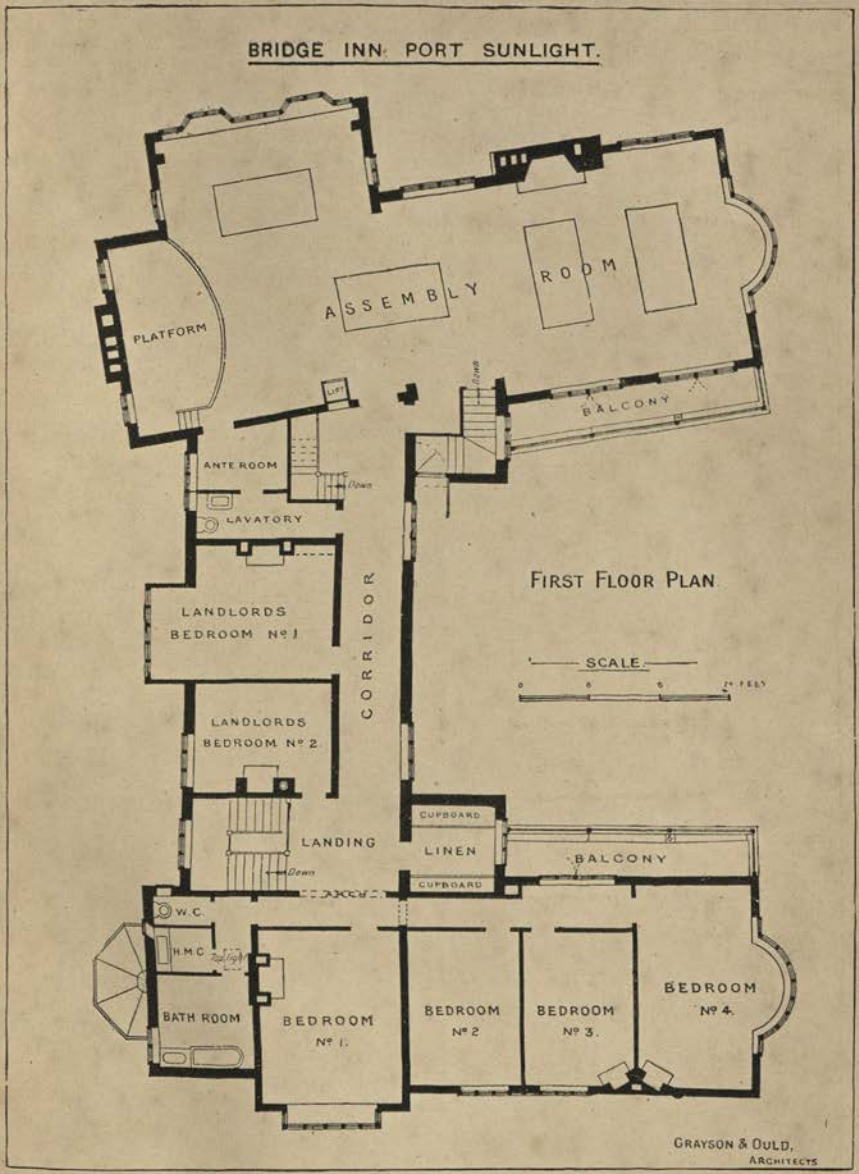
Temperance reformer, why are you not ready with a practical scheme of amelioration—an efficient antidote? Rigid Sabbatarian, why did you, in your narrow-mindedness, keep locked the doors of every museum, every art gallery, every covered place wherein are things that elevate the mind? Why did you banish the would-be well-doer to the contemplation of muddy streets and grimy walls? You, who may on the same day have dropped a crown into a plate to make dole and pauperize a fellow-creature who might have honestly worked had you helped to make his opportunity — you, maybe, will spend another crown in prosecuting, for Sunday trading, the widow shopkeeper who provides a cake and coffee for the 'drunkard.' I say that your loud-voiced denunciations will avail nothing, and that they ill become you, who are unable to put forth anything more meritorious in competition with that you denounce. There is a want to be fulfilled; bend your energies to its fulfilment. Let your antidote, be what it may, come into being. Let your coffee palace, with comfortable seats and newspapers and good books, rear itself up in close companionship with the socially inefficient houses you rightly declaim against, and

then demand that for every palace you provide ten of such houses shall disappear, and rest assured you will receive support.

If, in the old days, the want of the hostel and the ale-house parlour made itself felt, what right have we to suppose—for man remains the same colligative being—that the want no longer exists? It does exist, and the modern public-house fulfils that want, but in most inefficient manner. This want is recognised by temperance reformers of the calmer and more deeply-thinking—and hence more valuable —*genre*. Let me quote the words of two of such, Messrs. Rowntree and Sherwell, who say: 'It is seen that no scheme of temperance reform can be satisfactory that does not include a full recognition of men's social and recreative instincts. So long as no really effective challenge is given to the public-house as the working man's club and meeting-place, so long will it be comparatively useless to expect an improvement in popular tastes and an appreciable diminution of intemperance. Especially is it important to establish these counter-attractions if we are to develop the best possibilities in the lives of the young.' Unfortunately, such well-wishers and would-be reformers seem not to possess the courage of their convictions. They do not apply the argument that if they were to provide apposite counter-attractions and fulfil the want with enhanced efficiency, the doors of the lesser efficient would automatically become closed. They hesitate to bring



Ground Plan of the Village Inn at Port Sunlight.



First-floor Plan of the Village Inn at Port Sunlight.

anything forward *in competition*. They are eternally agitating, yet—they say it themselves—waiting for the 'clean slate'—for an open tableland of freedom upon which to set out their experiments. I say 'eternally' advisedly, for such a sweeping away of obstacles will never be beheld by them.*

If we had any conclusive evidence that the closing of public-houses would accomplish the so desirable end, we might with confidence concentrate our energies to that end. But such evidence is wanting. Teetotal propagandists are almost invariably anti-Protectionists, yet, with transparent inconsistency, the first thing they agitate for is 'protection' for themselves, that they may endeavour to ameliorate the condition of things. Yet in other matters—our industries, to wit—the mere suggestion that inquiry should be made as to the advisability of such 'protection' sends them into paroxysms of fury and vituperation. Such evidence as is available is indeed negative. Take, for example, the

* Preaching upon the subject of temperance reform by means of the Scandinavian plan, the Archdeacon of Manchester said: 'The irreconcilable opponents are men whom one deeply respects for their enthusiasm—the ardent teetotaler. They do not think a reform is worth having while they can *dream* of abolition. They see that all the principles of the local veto are compatible with this plan, but the *veto* is all that they want. They see that all the advantages of the Church of England Society proposals for limiting the number of houses are gained by it. But it is *not limitation* they want. *They will not contemplate the sale at all.* They are averse to compensation. Proofs and experience seem to have no effect on them.'

case of Italy. There, it would appear, licenses are not required. All and everyone may sell drink; but has any reader passing through the streets of Milano, Florence, or Rome ever seen drunkenness in the remotest degree comparable with *our* large towns? I have often listened to an Italian opera—you can do so any evening for a lira or two, probably only a few soldi for the poorer inhabitants—and then, near midnight, passed from one to another of the so-called milk-shops (*latte*) where drink is sold; stopping at each to hear an operatic air beautifully rendered by tenori or soprani to the accompaniment of the guitar, or to listen to a lively mandoline solo or a vocal quartette. The applause testified to the appreciation of the little audiences, and everybody appeared happy and contented. There is no unseemly hilarity—not the slightest disorder; yet everyone is drinking. Yet, moreover, the thoroughfares and the little narrow turnings are more closely studded with these refreshment places than are our streets with public-houses.

Other instances might be cited of the effect of 'free trade' in drink. There are, indeed, those who hold that free trade in drink with us would materially conduce towards temperance, and their arguments are quite as powerful as any I have heard in favour of reduction. If drink were sold as freely as bread, all monopoly would at once disappear, and when monopoly gives place to competition improvement invariably accompanies it. To

Village Refreshment Room at Delft.

secure custom the caterers would be compelled to offer inducements to customers by supplying them with a better article, and thus the villainously poisonous and maddening liquors at present sold would soon be refused. To reduce the number of establishments is to force people to take what they can get through monopolized channels, and to debar them from the benefits of competition, the advantages of which no one would dare to deny.

Before jumping to the conclusion that the mere number of refreshment houses is the cause of drunkenness, we should do well to pause and consider if there are not *other contributing causes*, even more powerful for evil. I suggest to the careful consideration of readers, and emphatically affirm it as my opinion, that it is *our system* and the *nature of our national beverage* which are most to blame. (The footnote giving the proportionate amount of alcohol in beverages shows that the amount is much larger in English than in foreign beers.)*

ALCOHOL IN BEVERAGES.

BEERS.	Percentage Volume.
Bass's Ale	8·41
Allsops' Burton Ale	8·25
Guinness's Stout	6·81
Good Bitter Ales	6·60
Porter...	6·00
New York Lager	5·86
Munich Lager	4·70
„ Boch...	4·60
Edinburgh Ale	4·41

The Gothenburg System.

In dealing with the question of temperance reform, one is constantly confronted by arguments on both sides based upon the mode of dealing with the matter inaugurated in Sweden, and known as the Gothenburg system. It may, therefore, be useful briefly to examine this system, the reason for its origin, and the results achieved by it.

Prior to the year 1855 the law of Sweden allowed every landowner tilling his fields to distil the native beverage of the country—*branvin*. This right he might also extend to his tenants so that it was calculated that in 1829 there was a still for every seventeen inhabitants in Sweden. This *branvin* is a spirit distilled from potatoes or corn, and contains from 40 to 50 per cent of alcohol. It was usual for a peasant to set his still going one week and invite all his neighbours to an orgie; the next week a neighbour would repeat the process. Thus the peasantry were fast ruining their constitutions and their farms by incessant drinking. Nor was the town population a whit behindhand in

	Percentage by Volume.
Wines.	
Port	20-23
Sherry	17-21
Madeira	19
Champagne	14
Californian / Australian	10-15
Burgundy	10-13
Rhine...	9-13
Claret...	9-11
Moselle	8-9
Spirits.	
Rum	72-77
Brandy	50-54
Whisky	48-56
Gin	45-50

this degeneracy. Cheap spirits led to very large consumption of them, and nothing but *branvin* was drunk, beer being regarded as a *temperance* beverage and the luxury of the middle and upper classes. The annual consumption of spirits was then nearly six gallons (5·9) per head of population.

In 1855, owing to an agitation which had extended over some twenty years, a law was passed abolishing the private stills, confining spirit-making to large distilleries, which had to pay a high excise duty on their productions, and giving to each commune the power of local option, both as regards the 'bar' and 'retail' sale of spirits. This law was rigorously enforced in the country communes, and a great proportion went so far as to exercise their right of total prohibition; but it seems to have had little effect in reducing the sale of spirits in towns.

In 1862 Dr. Peter Wieselgren, Dean of the city of Gothenburg, presented a petition, signed by no less than 8,800 of the inhabitants, in favour of closing public-houses on Sundays and holidays; but the magistrates held that they were unable to move in the matter. In 1863 the city obtained a new communal law, and a city council was appointed. In the following year, owing to the petition of Dr. S. A. Hedlund, a committee was appointed to inquire into the sale of spirits in the city. Its report was issued in 1865. The substance of the recommendations of this committee was that the licenses of houses selling spirits for consumption on the premises should be handed over to a company, who would carry on the business solely for the good of the working classes; that the shareholders in the company should receive the current rate of interest—6 per cent.—for the capital invested; that all profits accruing above this amount should be devoted to the welfare of the working classes, or transmitted to the town treasury.

On October 1, 1865, a *bolag*, or company, commenced its operations. Thirty-six out of the sixty-one existing licenses were handed over to it,* and by 1868 the whole of these 'on'

* There were also five privileged licenses, since reduced to one, that were out of the control of the town.

licences had been transferred to it. Of these, eighteen were retained as public-houses, four were appropriated to eating-houses, twenty were transferred by the company to hotels, clubs, and restaurants, whilst nineteen were not used.

The whole scheme consists in the elimination of private profit accruing from the national evil, 'spirit-drinking.' Having once obtained the control of the traffic, it was easy to institute reforms. Firstly, the company totally closed its houses on Sundays and holidays; then the hours of closing were altered to 6 p.m. in winter and 7 p.m. in summer; lastly, no one under eighteen years of age could be served with spirits.

The houses themselves are not made attractive; in fact, are difficult to distinguish from the ordinary city offices. They possess no comfort within, and no effort is made to induce a man to remain; rather is he served and hustled out. The company has established four eating-houses from its profits, and here one dram of spirits is allowed with the meal. The company lose a considerable amount per annum on these houses; and, besides them, it has erected seven reading-rooms. Here tea, coffee, light refreshments, and small-beer are served. The *bolag* has also obtained control of many of the 'off' licenses. Most of these it sublets to retailers, with the proviso that not less than 55 gallons of *branvin* shall be supplied to a person resident within the city.

Now we have to ask ourselves, 'Has the system proved a success or a failure?'. This question has given rise to much controversy. If the essence of the system is considered to be the reduction in the sale of spirits, it must be admitted to have proved a success, for the annual bar consumption in Gothenburg has fallen from 12·99 litres per inhabitant in 1875 to 5·95 in 1899; but if it was hoped and expected to prove a partial or wholesale cure for drunkenness, then it must be admitted it has proved

a failure. By its very constitution, indeed, it is precluded from being a success in the solution of the drink problem, for it must be remembered that it deals exclusively with the sale of spirits; beer and wine are sold at its houses, and at very many other houses in the city, and at those not under the company the sale of these commodities is unrestricted. The people, unable to obtain any quantity of spirits, as before, have taken to drinking wine or beer—certainly more wholesome, but still intoxicating—and the percentage of cases of drunkenness has *risen;* for in 1875 they were 39 per 1,000 of the inhabitants, whilst in 1899 they stood at 58 per 1,000.

One defect, and that of grave import, is found at Gothenburg—viz., that nearly the whole of the profits (now some £37,000 per annum) are handed over in reduction of the rates. In this way the city council raises nearly one-third of its revenue; and with such a large interest at stake, it is to be feared that the sale of spirits is not carried on in the strict principle of the foundation of the system. It were far better that the profit were devoted to providing some means of counter-attraction, and gradually supplying the working man with a means of rational enjoyment, and educating him to the appreciation of other means of spending his time than in excessive drinking.

The Norwegian System.

In Norway the same rights to distil *brannin* as existed in Sweden were given, in 1816, to all who tilled their own land. So great, however, became the evil of this wholesale distillation and consumption of a very common and ardent spirit, that in 1840 steps were taken to limit the number of stills. In 1871, profiting by the experience gained in Sweden with its Gothenburg system, the company* system was adopted in all towns throughout the country. In Norway the law enacted that all profits should go to the establishment of counter-attractions to the drinking-bar, whilst lax administration is guarded against by referring the final decision in all matters relating to the companies to the Department of the Interior.

The gin-palace of Norway is a building of unpretentious exterior, possessing nothing to attract, and little to indicate beyond the words placed above its modest entrance-door—*Udskjaenkning af Brandevin.* It is neither comfortable nor spacious; newspapers and seats are not provided, and people are not allowed to loiter in it. One must drink one's dram and go, one of the regulations being that no one is allowed to be served with more than two glasses of spirits at a time within an interval of four

* The Norwegian equivalent to the Swedish *bolag* is the *samlag*, or company. This, in the capital, has five directors and a committee of forty, the directors and twenty-five members of the committee being elected from among the shareholders at the general meeting of the society; the other fifteen members are nominated by the municipal council, and the Crown is also represented. The capital of the *samlag* was fixed at 80,000 kroner (£4,445), the shareholders, according to a fundamental rule of the Gothenburg system, receiving no more than 5 per cent. for their money, while the surplus profits, after setting aside a reserve fund, are given to objects and institutions of benevolence and public utility. In this last particular the Bergen *samlag* is naturally regulated by the Norwegian rather than the Swedish principle, the surplus profits of the liquor *bolag* in Sweden being handed over to the local treasury for the reduction of the rates.

hours. Children and young persons under sixteen are excluded. The hours of sale are very restricted—viz., from 8 a.m. till noon, and from 1.30 to 7 p.m. On Saturday they close at 5 p.m.—in some cases earlier—and do not reopen until eight on Monday morning. On all holidays, days before festivals (*i.e.*, Christmas Day, etc.), and election days they are totally closed.

But Norway, by a subsequent Act (that of 1894, which came into operation January 1, 1896), has gone further than this. This law made it illegal for distillers or wholesale dealers to sell less quantities of spirits than 55 gallons. This prevented the clubbing together of several persons to purchase the minimum quantity allowed—$8\frac{4}{5}$ gallons—under the old system. Local veto had closed nearly all the spirit-selling houses in the country districts. An attempt was made to close those of the towns in the same way, and by popular vote no less than twenty-six towns have abolished the company's shops during the years 1896 to 1899. By this Act also provision was made for distributing the profits made by the *samlags* between the municipality, the State, and the *samlag*, the proportions at present ruling being 15 per cent., 65 per cent., and 20 per cent. respectively.

It is to be remembered that these laws affect only the sale of spirits, wine and beer being sold in the ordinary way; so that whilst the consumption of spirits has decreased, the consumption of wines and beers has increased. In fact, in 1895 a treaty for the importation of Portuguese wines, containing up to 21 per cent. of alcohol, was arranged. As *branvin* could not be sold *per se*, an ingenious device was hit upon. This strong spirit was exported to Hamburg, and a large drawback—more than the original tax—obtained on the export; it was there mixed with common red wine and reimported,

paying only a light wine duty, as Oporto wine. This '*laddevin*,' in 1896 and 1897, swept over the country, its sale was unrestricted, and its price, being but one-third that of *branvin*, made it a popular drink with all classes.

This is a glaring example of the methods that will always be found to overcome any wholesale restrictions or prohibitions unless a rational means of educating the people up to their level has been followed.

The Russian System.

In 1896 the Russian Government assumed the entire monopoly of selling spirits. In establishing themselves as the sole retailers of spirituous liquors, they stated that they wished thereby (*a*) to obtain for the State the largest possible amount of revenue from this trade, (*b*) to diminish the great amount of drunkenness prevalent, especially among the lower classes, due to the consumption of *vodka*.

The distillation of spirits, whilst remaining in the hands of private people, is put under immediate official control. The retail distribution is carried on (*a*) in the shops and depots of the Government, (*b*) by keepers of eating-houses, restaurants, and private establishments, who sell on commission under the Government.

In rural districts spirits can only be obtained in sealed bottles, duly labelled with the price, quantity, and alcoholic strength, and purchasers are not allowed to open the bottle either in the shop nor whilst carrying such to their homes. Moreover, the sellers of spirits falling in the second category obtain only a small commission (about 3½ per cent.) from the Government on such sales. In towns, however, certain keepers of restaurants are allowed to sell the bottled spirits, and to open them on the premises, whilst a few privileged *buffets* may sell spirits of all

kinds by the glass. This last privilege is confined, however, exclusively to restaurants and buffets of the highest class, such that the prices there charged prevent the working class from patronizing them.

In taking over the monopoly, the Government at the same time seized the opportunity for a wholesale reduction of licensed houses of every kind. Thus, in St. Petersburg the number of wine and spirit shops was reduced from 937 to 178. These are allowed to sell wine and Government spirits in bottle. Some others are allowed to sell beer and wine only. Of the 650 licensed eating-houses, only 250 were relicensed, whilst the number of privileged restaurants stood at 15. [Compensation, except in cases of very ancient vested rights in distilling and selling, was not paid to such as lost their licenses.]

The Government, recognising that some other form of recreation and attraction must be supplied to take the place of the one thus done away with, has voted sums of money for the establishment of tea-rooms, reading-rooms, popular theatres, and theatrical representations. It must be said, however, that the amount thus set aside is totally inadequate, and it is too early to be able to say what will be the effect of this monopoly. It is to be feared that the Russian official mind will be more open to the collection of revenue by the sale of spirits than to the promotion of temperance, and hence spirit-drinking will be transferred from a licensed public-house to some more secret form of obtaining it. One point, however, will be gained: it will be impossible to obtain spirits on credit, hence much misery will be spared to the peasantry.

The Russian mode of procedure, it will be seen, was drastic. The system bears upon its face the possibility of working good; but the fact that funds for counter-attractions are withheld, coupled with the fact that the Russian official mind is indelibly corrupt, affords little ground for hope that it will

prove a scheme of beneficent amelioration until that Empire of deception and immorality has passed through the cleansing fires of internecine revolution.

The Earl Grey System.

The following eight clauses have been put forward as the main articles of association of a company scheme for control of the liquor traffic of which Earl Grey has been the leader:

1. Whilst recognising that public-houses are a public necessity, to eliminate, as far as possible, the element of private profit from the retail trade of intoxicating liquors.
2. To accept new licenses wherever magistrates are willing to grant them, owing to the growth of population or for other reasons.
3. To vest the control of these public-houses in persons who desire no profit from the sale of intoxicants.
4. To secure a strict enforcement of the regulative provisions of the existing licensing law.
5. To maintain the public-houses acquired, not as mere drinking-saloons, but as refreshment houses, as far as local conditions will permit.
6. To provide counter-attractions to the bar in reading and recreation rooms, where food and non-intoxicants can be obtained.
7. To supply only the purest and most wholesome articles that can be obtained in the open market.
8. To limit the shareholders' dividends to 5 per cent., and to pay all profits (over and above depreciation, reserve, sinking-fund, and dividend) to trustees for public purposes.

Dealing seriatim with its clauses, it is to be pointed out that the gist of Clause 1 is common to all the schemes for dealing with the liquor traffic,

only it goes further than the greater number of temperance advocates will admit of in acknowledging the necessity of the public-house.

Clause 2 provides for the prevention of any further granting of licenses to private individuals, it being a foregone conclusion that magistrates would rather grant a license to a company of this sort than to a private person having no other interest but to push the sale of intoxicants.

Clause 3 is more fully provided for by Clause 8, in which the amount of profit is clearly stated. This, however, gives rise to a serious point: Would it be possible to raise at 5 per cent. interest the enormous capital required to take over the licensed interests in this country?

Clause 4 insures a strict adherence to the licensing laws. This would mark advance, for, it is to be feared, this seldom obtains in this country.

Clauses 5 and 6 are the crux of the scheme; in fact, it is the system which is more likely to help real temperance reform than any schemes hitherto set out. First supply all sorts of refreshments, together with the intoxicants, at a bar; then, by the provision of comforts, such as reading-rooms, etc., those who may be led to become accustomed to non-alcoholic beverages will forsake the bar for the other attractions. It is by education—not by forcible restraint—that temperance reform is most likely to meet with success. In all experiments of partial and total prohibition hitherto attempted

the result has not been a wholesale stoppage of drunkenness, and in the cases where total prohibition laws—as in the State of Maine, U.S.A.—have been passed, they are now openly evaded; in fact, in the instance here quoted, the drinking-bars are as common in the towns of that State as in any other town.

The importance of Clause 7 cannot be too highly recognised. If people will have alcoholic beverages, then these should be as pure as possible, and only in a system where the brewer and distiller have no tie or hold on the retailer, and monopoly is reduced to a minimum, will this ever be obtained.

From a consideration of the clauses of Earl Grey's system we see that it is founded upon the Swedish and Norwegian systems. It bears upon its face the imprint of success for three principal reasons: firstly, because it would rest the control of public-houses in the hands of persons who would neither desire, nor could they receive, any profit beyond a moderate return in interest for their money invested (clause 3); secondly, drinking-bars and saloons *per se* would disappear, and places of various refreshment take their place (clause 5); and, lastly, from profits obtained by the sale of wholesome refreshments, comfortably furnished rooms and counter-attractions would be provided. It is difficult to say in which of these the greater prepollency lies, but assuredly not the least is in the second. It is a point kept well in view in the Scandinavian systems, the

terms of the contract setting out that the manager is bound to supply his customers with good and well-prepared food, cold or warm, and he is on his own account to carry on the sale of provisions, as well as wine, coffee, tea, cocoa, soda and seltzer-waters, etc., as would be done in a well-conducted eating-house.

It is obvious there is one very efficient method of doing away with drunkenness—viz., to make it impossible to get drunk—and herein lies the great importance of the Scandinavian plan and its modifications, such as Lord Grey's. The bar-tender, who is appointed subject to the approval of the magistrates, is an official in uniform, his collar bearing a number and initials indicating the particular *samlag* in whose service he is. He has *no interest whatever* in the sale of liquor, but, on the other hand, an intimate interest in the prevention of drunkenness; for failure to preserve sobriety would cost him his position.* The same may be said of the manager; for both have fixed salaries, and the plan of subsidizing these with a bonus upon *non*-intoxicants sold is a good one. Such a state of

* Discretionary power is vested in the bar-tenders to refuse spirits to the young, and to decline to serve those who, in their judgment, have already had enough. How exceeding important this power is—one which could never be carried out in private establishments—is evidenced by the fact that in Bergen alone (a town having at that time a population of less than 40,000 inhabitants) in the first year of the *samlag* operations 51,248 such refusals were made and enforced.

things could not, of course, obtain in regard to private monopoly, and therefore it is the more necessary that the law should be most rigidly enforced against any person who is the *cause* of drunkenness. The law (Licensing Act, 1902) passed by our present Government not only prohibits children under twelve years of age entering the public bar of a public-house, but also empowers the police to arrest, without warrant, any drunken person; whereas prior to that the absurd anomaly existed that a subsidiary charge had to be maintained, such as being drunk *and disorderly*, or drunk *and incapable*, so that drunkenness *per se* could not be touched by the law. This recent Act has done much to clear the streets of our large towns of drunken men and women. In all cases the *cause*—*i.e.*, the publican supplying the drink—should be heavily fined, such fine to be handed over by the magistrate towards a fund for counter-attraction establishments.

In social evolution problems are usually attacked with the best hope of success through the children. I have ventured to point out that this is so in regard to physical deterioration, and when one reflects upon the helplessness of reclaiming and reforming chronic drunkards, one at once appreciates that the young form the most efficient conduit for the conveyance of beneficial influence. Such admirable organizations as the Band of Hope, the Church Temperance Association, and such-like, by which is inculcated,

at an early age, the immense value of temperance; cannot be too highly praised.* All honour be to those who so bravely occupy themselves in such work! Intemperance in parents, moreover, acts direfully upon the physique of the offspring. If an adult 'take the pledge' for the purpose of beneficially influencing others by the force of example, that man or woman performs a good and brave action; but the taking of the pledge by an adult as a reinforcement to self-restraint is more or less a cowardly action. If the will be strong enough to enable the individual to take that decisive step publicly, it should be strong enough to resist excess privately.

There are many circumstances under which compromise is the best course, and I am strongly of opinion this holds good in regard to the drink

* Among the recommendations of the Interdepartmental Committee of Inquiry one observes that the value of appropriate instruction is not overlooked. On this head we read: 'The Committee believe that more can be done to check the degeneration resulting from "drink" by bringing home to men and women the fatal effects of alcohol on physical efficiency than by expatiating on the moral wickedness of drinking. To this end they advocate the systematic, practical training of teachers to enable them to give rational instruction in schools on the laws of health, including the demonstration of the physical evils caused by drinking. At the same time, the Committee cannot lose sight of the enormous improvement which has been effected in some countries, and might be effected in this country, by wise legislation.'

question.* A drunkard may be looked upon either with pity or disgust, according to whether he or she be mentally weak or strong, according to whether he or she 'fly to drink to drown sorrow,' or whether excess be indulged in for the pleasure of the thing. The moderate drinker, if he be sure of himself, needs no extraneous restraining influence, such as the pledge, to strengthen his intentions; and if a man elect to wear some outward and visible sign, personally unnecessary, for the purpose of influencing others to moderation and of benefiting our social conditions of life, that man is a brave man. The necessary compromise has been inaugurated by a brave man—Earl Roberts of Kandahar—and if it be carried out to anything like the extent to which other temperance organizations have attained, the beneficent effect will be inestimable. It is usual to associate the 'drink problem' in the mind with our manually-working classes, but, unhappily, the evil of excessive indulgence pervades our mentally-operative units—our clerks, assistants, mercantile men, and especially that vast body known as 'something in the City,' whose *status* is both uncertain and insecure, and who appreciate the degrading trait whereby 'a deal' may be sealed by a drink. Some excuse may, per-

* The late Archbishop of Canterbury, it will be remembered, although himself a total abstainer, spoke highly and warmly of the good work done by the *moderate* section of the Church of England Temperance Association.

haps, be found for the custom of 'treating' on the conclusion of a bargain, but the convivial system of treating and reciprocal treating is fraught not only with dire results morally, but disastrous results commercially. The waste in time and money is incredible. Far better would it be if minor 'deals' were accentuated by a luncheon, and more important transactions by a dinner. The curse is brought down upon drink in regard to the commercially occupied through 'nipping'; upon intemperate factory workers by 'soaking.' It is against this 'nipping' and standing drink between meals a crusade should go forth; for, from both the point of view of commercial efficiency and of national health, it cannot be too strongly condemned.

The crusade now getting into fighting formation is known as the semi-teetotal movement, the organization, of which Earl Roberts is President, bearing the title 'The Semi-teetotal Pledge Association.'* At a recent meeting 'called to report progress,' the Lord Chief Justice pointed out that the objects of the organization were very simple. 'It wishes,' he said, 'simply to prevent people from taking alcohol when they do not want it; to abstain from it between meals; to avoid nipping; to set their faces against standing drinks, which is easy, or being stood drinks, which is not so easy.' The one thing that the Association asks of its members

* The general offices of the Association are at 76, Regent Street, London.

is to sign a pledge undertaking to abstain from all intoxicating drink except at mid-day or evening meals. They may, if they like, go further, and abstain altogether. In that case the Association issues for their wear a blue badge. But if a member desire to carry out only the primary object of the Association—viz., to spread the practice of not drinking alcoholic liquors between meals—and thus becomes a semi-teetotaler, he wears a red button. In view of the chaff to which he will doubtless be subjected by his festively-minded friends, it does not seem improper to speak of it as the red badge of courage. It will enjoin on him the duty of refusing to stand anyone a drink on any pretence whatever.

The semi-teetotal pledge is as follows:

'I SOLEMNLY UNDERTAKE, BY GOD'S HELP, TO ABSTAIN FROM ALL INTOXICATING DRINK, EXCEPT AT MY MID-DAY AND EVENING MEALS.'

Such a form of pledge, it has been universally remarked, is at once both definite and reasonable, and there can be no doubt, if the work continues to be supported with the enthusiasm already evinced in its favour, this movement will mark an important epoch in temperance work. To give an idea of its popularity and usefulness, it may be mentioned that within a month of the formation of the Society upwards of twelve thousand pledges were asked for by persons residing in all parts of England, Ireland,

Scotland, the Colonies, Africa, and even in India. The movement, which is everywhere enthusiastically welcomed by all classes of the community, and has already assumed more than national proportions, is strictly non-sectarian, and entirely free from all anti-teetotal bias.

I make no apology for thus pointedly referring to this admirable project; for whilst there are many who cannot see their way to subscribe a pledge of total abstinence, there are thousands of people who would gladly aid the cause of temperance by joining in a work which forbids promiscuous drinking—that fruitful cause of intemperance. The movement is receiving medical approval and support by reason of the fact that it is in accordance with sound hygienic principles. 'Undoubtedly many of the influences of modern life tend to encourage irregular forms of drinking, and any movement which aims at discouraging the chronic tippling now so prevalent amongst women and many business men, and limiting the imbibition of alcoholic beverages to meals, should receive support on physiological grounds.'*

'Large numbers of men damage themselves irretrievably by promiscuous drinking without ever becoming drunk. It is in averting this damage that the Association may be of such signal service. In many lines of commercial activity the occasional drink, repeated often an incredible number of times

* The *Medical Press*, 1903.

during the twenty-four hours, is the customary precursor or accompaniment of the transaction of business. It needs an exceptionally strong-minded man to depart from the usual method in dealing with his fellows. It needs a still more exceptional physical constitution to pass unharmed through the daily dosing with alcohol that such practices necessitate. It is not at all unlikely that a greater measure of success may attend the comparatively moderate requirements of "semi-teetotalism" than has yet met the efforts of the instigators to total abstinence. The consumption of alcohol in Great Britain shows no marked signs of decreasing. The evils wrought by alcoholic excess remain a serious menace to our national welfare, and a cause of vice and disease probably unequalled in this country by any other one thing. Any system that may tend to free the country from this widely prevalent and destructive influence must be welcomed by all who have the good of the nation at heart.'*

Lord Alverstone stated that he had, in his thirty years' experience as a barrister, seen many sad examples of ruin which had begun with this practice, and he was assured by those in a position to know, especially by his friends in the medical profession, that the habit of intemperance as a result of nipping was by no means diminishing, but was one which, in spite of a growing decrease of drunkenness, no longer considered the venial

* The *Lancet*.

offence that once it was, could not be said to have any less a number of victims or any less disastrous influence than formerly.'* The movement has been

* Inebriety represents both a shocking loss of life and a deplorable waste of material wealth. In this connection the conclusions of the late Mr. F. J. Neison, the eminent actuary, are very striking. He found that while 10 temperate persons from fifteen to twenty years of age die, 18 inebriates of the same age die; and that whilst the deaths in England and Wales, in a certain number of the population, would be 110·2, the number of intemperate persons dying in an equal number was 357. Between twenty-one and thirty years (inclusive), 51 of the intemperate die for every 10 of the temperate. Between thirty-one and forty about 40 die. In the first group the fatality is raised 80 per cent., in the second group over 500 per cent., and in the third 400 per cent. He calculated the chances of life as follows: A temperate adult's chance of life is at twenty over 44·2 years, an intemperate's 15·6 years; at thirty, a temperate's 36·5 years, an inebriate's 13·8 years; at forty, a temperate's 28·8 years, and an intemperate's 11·6 years; and at fifty, a temperate's 21 years, and an intemperate's 11 years; and at sixty, a temperate's 14 years, and an intemperate's 9 years. Mr. Neison found that the relative mortality of the intemperate exceeded that of the population at large 3·25 times from sixteen years upwards, between twenty-one and thirty years more than 5 times, and in the following twenty years fully 4 times (*Journal of the Statistical Society*, London, September, 1851, vol. xiv.). The report of the Scottish Amicable Insurance Company for 1876 states that the mortality among male employés in inns and public-houses was 68 per cent. above the Healthy Males Table. Mr. Thomas Wallace, in a paper read to the Scottish Actuarial Society at Edinburgh, pointed out the high rate of mortality among licensed grocers, hotel-keepers, and publicans, between the ages of forty-five and fifty-four years, the death-rate being respectively 18, 29, and 28 ('Mortality of Total

aptly referred to as 'graduated temperance,' and, as I have ventured to point out in regard to other points in social improvement, it is by gradual increment towards the ideal that the most important changes are wrought. There never was a time when the drink question demanded more earnest and serious consideration in regard to *all classes* than the present. The pernicious 'nipping' is largely attributable to the excessive pressure of business worry in city life. There is no doubt that London and, *a fortiori*, other great cities produce in the present day a tension of the nervous system as baneful as it is unnatural. 'One has only to look at the living maelstrom which pours into airless and sunless London offices, workshops, and factories every day from the suburbs to see the strained, eager, earnest, and inwardly preoccupied faces of the people who are compelled to sacrifice

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Abstainers in British Insurance Societies,' C. R. Drysdale, M.D., Chicago, 1893).

It may be interesting here to note the Registrar-General's statement in his forty-fifth annual report as to the death-rate of traffickers in strong drink, which he calls '*an appalling mortality.*' With the annual average mortality of all males as 1,000, ministers of all denominations show a comparative death-rate of 556; farmers and graziers, 631; agricultural labourers, 701; males in selected healthy districts, 804; carpenters and joiners, 820; coal-miners, 891; masons and bricklayers, 969; plumbers, painters, and glaziers, 1,202; brewers, 1,361; innkeepers, publicans, and beer dealers, 1,521; public-house and hotel servants, 2,205 (Dr. Norman Kerr, 'Inebriety').

their health and overstrung nerves in the cause of civilization.'*

It is abundantly obvious that the first thing required to be done is to provide an adequate number of meeting-places where refreshments can be obtained, other than public-houses, and the necessity is as urgent in the small villages as in the large towns.† What, it has been asked again and again, is a working man or a factory hand to do after leaving work? Under present conditions he must either go to a close room with no entertainment or to the public-house. What, it has also been asked, is to be expected but puny people under such conditions? In Garden Cities it is to be hoped that rest and recreation will be obtainable as much as possible *al fresco*, that good use will be made of the gardens, recreation spaces, and public places, where not only temperance drinks, but light beer of the laager type might be enjoyed. It has been abundantly proved by statistics that restric-

* Dr. Robert Jones, Physician to the London (Claybury) Asylum.

† Good work might be done by temperance reformers, of the moderate view order, were they to look up and agitate for the repeal of obsolete yet still active Acts of Parliament which *positively militate against temperance.* Where, for example, could one find a more mischievous anomaly than the Act which prohibits under penalty the sale of a glass of ginger-beer or other temperance drink after 10 p.m., whilst such may be obtained in the same street at any public-house, whither, of course, the thirsty must be driven?

tions upon innocent amusement and pleasures during holidays and Sundays leads to excess in drinking. This is strikingly noticeable in regard to Scotland—so remarkable at one time for Judaic observance of the Sabbath—for whereas in England half a gallon of spirits was the quantity consumed per head and in Ireland a gallon, in Scotland it was twice the latter quantity. All thinking persons will recognise that temperance reform is largely a question of the entertainment of the people. But far more important than the manner and mode of amusement in regard to increase in temperance are healthy and comfortable homes, and these, as calculations in the foregoing volume will have shown, Garden Cities will be in so unique a position to furnish.

One of the most potent factors in the amount of drunkenness can be traced to the late hour to which the public-houses are kept open. Further limitation in this respect, it might be thought, would be strenuously opposed by the publicans, but I am informed in many instances they are of opinion that not only would their work be lightened, but that their loss from an earlier closing hour would be practically inappreciable. It is very questionable whether, having regard to the great cost of lighting the palatial 'publics' it is now the practice to erect, the takings between the hours from, say, 11.30 p.m. to 12.30 a.m. much more than outweigh them. One thing is very certain—the life of barmaids and bar-

men would be vastly improved if the great majority of public-houses were closed at 11 p.m. This important matter has recently received very careful consideration in Glasgow, where during this year the practice of closing public-houses at ten o'clock has been adopted. A comparison made of the 'drunks' and criminal cases after but three months' working with the corresponding period of the previous year is very favourable to the new order of things. The diminution in the week-end 'drunks' works out at an average of 26 per week-end, and, taking the returns for complete weeks, the figures show an average decrease of 32 per week. The figures for all cases, including 'drunks,' show a decrease on the whole of 48 per week.

Now, of the thousands upon thousands who nightly spend their evenings in public-houses, the percentage of the semi-drunk at, say, ten or eleven o'clock may not be great; but weariness combined with additional drink during another hour brings about much evil. Again, the opportunity for 'just one more' which is presented to men who may have left one house at a moderate hour, in passing others still unclosed, is seized upon, ofttimes with unhappy and serious results.

The consideration of drink and late hours leads up naturally to a matter which cannot be discussed here. At that hour and in that condition man's moral strength is at its lowest ebb. A straw might turn it to the one side or to the other. Yet that is

the hour when the prostitute is permitted full scope to influence for evil the thus weakened morale. Narrow-minded, short-sighted policy akin to that which for so long removed from the vast majority of the public all that was elevating is responsible for the disgraceful conditions of our streets—a condition which would not be tolerated in any other civilized country. This obtains for much the same reason that much of our drunkenness obtains—the outcry for prohibition, with the face set against regulation. This policy results, not in exorcism, but the driving of vice from pillar to post. The absolutely necessary view that such conditions are the direct outcome of natural law is never considered; in striving to attain an impossible ideal amelioration is stultified and vice parades the highway, to the detriment not only of the matured, but of the young and erstwhile innocent. All this could immediately be altered would we do as others have done—take a broad and enlightened view of a natural necessity, and make appropriate provision and regulation for it; then would our streets be purified and our national health, especially that of our army and navy, vastly improved.

It were inutile to dwell upon the evils of excessive drinking and its collateral vices. Our energies should be concentrated towards the introduction of remedial measures on a scale to at once make their beneficial influence apparent. But it is precisely this concentration of effort upon the part of the

many that we in Great Britain are lacking. One has seen, even by the short review of the work of other nations in the preceding pages, that other countries, having made up their mind to move in the matter, did so in no half-hearted manner. Apart from the splendid organizations to which I have referred, which strive to do good by moral inculcation, we have a handful of well-meaning and valuable workers, who, though incessantly working, fail — principally through lack of co-operative organization—to bring into play a concrete system, attended with such a scale of success as to constitute it example-setting. And such valuable work is, without doubt, hampered, rather than aided, by the outcry for unattainable ends—for prohibition and total abolition of existing conditions.

I trust it may have been shown in these pages that the Scandinavian methods have wrought much good, and that they fall short simply because they are not sufficiently comprehensive. In this, therefore, we see example-setting reforms. The question for us to consider is how best to modify the Gothenburg method to make it of maximum worth to ourselves. This work has been already commenced. As long ago as 1879 the Lords Committee admitted that undeniably beneficial results accrued from this system, and recommended its adoption. Amongst those rightly appreciating its intrinsic value at an early date was Mr. Joseph Chamberlain, and the town represented by him in Parliament

also showed its alertness and enlightenment in this regard; for the Town Council of Birmingham voted in favour of taking up the Gothenburg system, if they could obtain legislative facilities, whilst the Board of Guardians—by an absolutely unanimous vote—expressed their desire to adopt it. Years have passed on, but those who took the trouble to study the matter still find themselves to-day as cordially in favour of the scheme as they were a quarter of a century previously. Numbered amongst them is the statesman referred to, who, in 1877, drafted a Bill in favour of municipal licensing, and who says: 'The system has done marvels for Sweden, and would do the same for this country, if it could only have a chance.' One of the first to urgently press forward the claims of the Gothenburg system was the Bishop of Chester, but the matter subsequently became crystallized into form under the style of 'Earl Grey's system,' which I have already described.

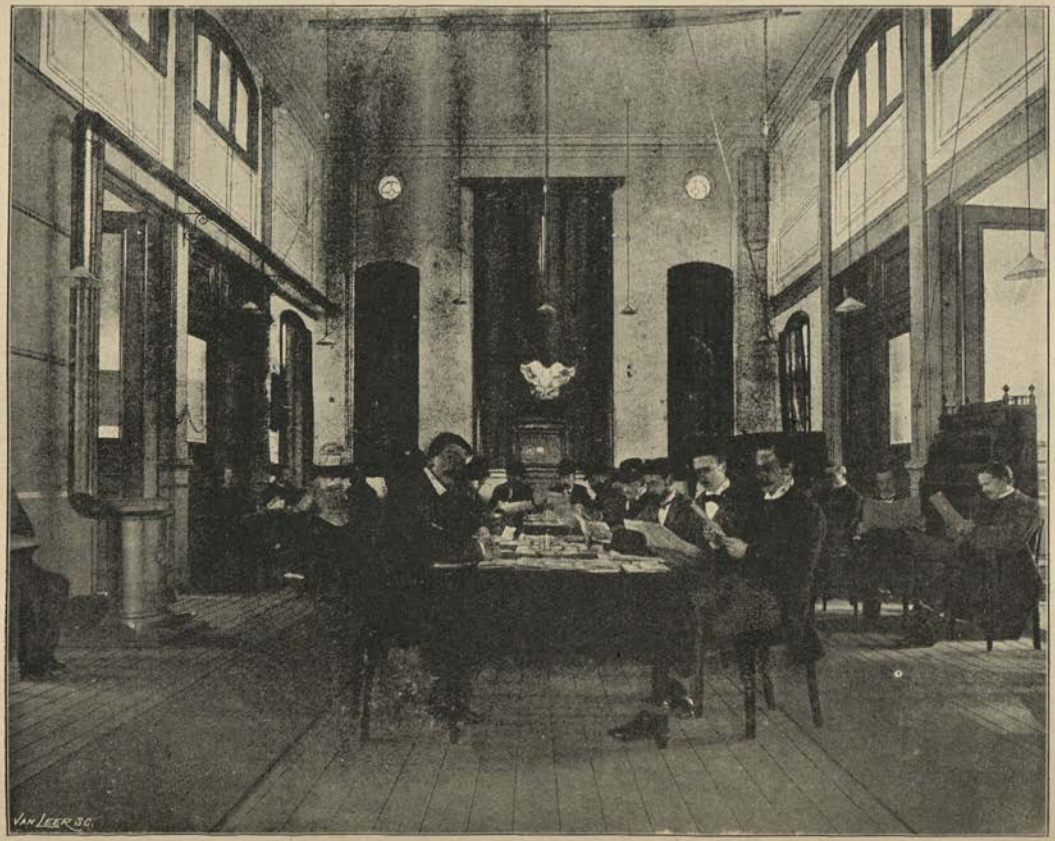
Constructive temperance reform, rather than propaganda, is what is now urgently called for. It is sincerely to be hoped, therefore, that every endeavour will be made to bring to public notice the power for good possessed by this modification of a system which has demonstrated success elsewhere, and that our somewhat reticent advocates will by no means lose heart, but, on the contrary, press forward with still greater vigour; that they will not continue to wait for 'the clean slate,' but—with the

cordial co-operation of the magistrates, who should grant licenses whenever companies can be formed —bring into being their counter-attractive hostels, and fight the battle on the merits of the system, resting assured that their more common-sense and more wholesome method of supplying the public need for refreshment, rest, and recreation will not only be thoroughly appreciated, but that existing conditions will automatically become modified, because of the necessity, from purely business considerations, of falling into line with them. These workers at least have the satisfaction of knowing that, no matter what the odds they may have to contend with, and the disabilities they are compelled to work under in normal conditions, Garden Cities will prove for them a fair and unhampered field of progress.

Unless the executive authorities of Garden Cities be grossly unmindful of their duties—duties and opportunities with which they will find themselves vested in unique and almost unexpected manner—the public-house *per se*, as well as the 'gin-palace' type of 'bar,' will never show itself in these specially organized communities. For refreshment, rest, and recreation facilities should be abundantly provided, but *in every instance all three should* be found in combination. An excuse that this type of hostel is not popularly desired is not for a moment tenable. It is but a few years since in the Metropolis a good cup of tea or coffee or a palatable

temperance drink was practically unobtainable in a spacious and comfortable saloon comfortably and adequately furnished. Within the last decade *millions* of capital have been invested in the provision of 'tea-rooms.' We find them in the most expensive thoroughfares, in companionship with palatial 'publics' and the best restaurants, in the haunts of pleasure, where vice stands upon the doorstep. But, withal, they are unequivocally successful morally, materially, and commercially; yet no intoxicants are sold. A few years ago it would have been deemed impossible to have paid the enormous rents and expenses except by the sale of 'drink.'

Every refreshment establishment in Garden Cities should be of this type, with the addition that both classes of beverage should be obtainable. The Earl Grey System, as has been explained, provides for this, and what is wanted in addition are 'refreshment gardens,' on the lines of those to be found in Bavaria, where the inhabitants might spend an hour or two of their evenings, not only in the enjoyment of their pipes and a *krug* of foaming wholesome, lightly alcoholic beer, but might take their meals *al fresco*, for which nothing could be better adapted than Garden Cities.



Reading Room, Agneta Garden Village, Holland.

EDUCATION

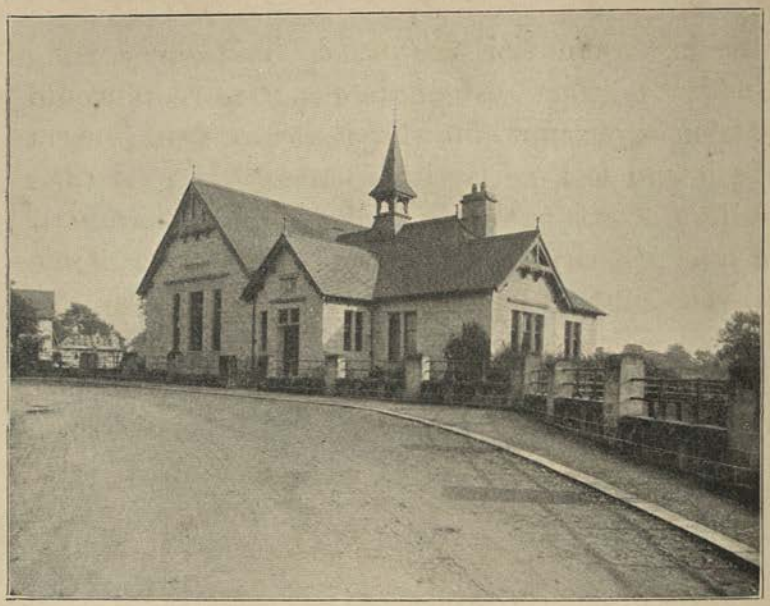
MUCH that has been said concerning the moral effect of new and well-ordered cities of limited population, it will be seen, also holds good in regard to education. One of the striking features of a universal and thorough system of education—side by side with its paramount importance—is its enormous expense. But if we pause to analyze this a little, we see at once that this also arises largely from the overgrowth of our towns. For example, the sites necessary to be reserved for schools and playgrounds could be secured in Garden Cities at the rate of some £40 per acre. Contrast this nominal expenditure with that of London, where the sites for Board Schools have averaged the enormous cost of £9,500 per acre. What this initial expenditure upon sites means in the practical working of the Education Act is brought home to us when we recall that out of the estimate—made some ten years since—of £12 per school place, no less than one-half, or £6 per child, has been absorbed by the cost of the site. Space for cognate objects, such as playgrounds of ample area for drill purposes, sports grounds, plots

for the teaching of gardening, for the practical study of botany and such-like, subject to the same mode of comparison, are so adversely and seriously affected by the exigencies of large towns that their provision becomes positively impossible.

In this relation it occasions me the greatest surprise that the opportunity and the economic advantage derivable from the utilization of the roofs of the London Board Schools as playgrounds should not have been seized upon, but that the inauguration of the system should have been left to the much maligned landlords of industrial dwellings. Apart from the indisputable fact that in great towns the air is much fresher and more valuable above than below the schools, the economic gain would be very considerable, as becomes obvious from the following considerations. Up to September, 1903, the number of sites that had been acquired for permanent day-schools was 531. These cover the surprising area of over twenty-one million square feet (21,502,562), or nearly *five hundred acres* (493). The actual purchase cost of these sites was *nearly four millions* sterling. Taking the approximate ratio of building-covered area to open play-ground as being as two is to one—*i.e.*, that the buildings cover two-thirds of the total area—we have : area absorbed by buildings, 329 acres; area available as playgrounds, 164 acres. Thus the cost of the London School Board playgrounds was *a million and a quarter* (£1,277,606). But the value of the roof space *absolutely wasted*

Playground in a Garden Village—Girls.

Playground in a Garden Village—Boys.



Stone-built Schools in the Model Village of Nidd, Yorkshire.

cost no less than *two and a half millions* sterling (£2,555,212). The cost of the concrete roofs would have been approximately the same as the present tile roofs and less costly in up-keep. But by their utilization London would have gained *over three hundred of the most healthy playing grounds available.* Moreover, had they been so made use of, a million of money could have been saved, because the balance of £277,606 would have been ample to defray the cost of the marginal area necessary to secure the existing degree of isolation. Thus, with a large saving in expenditure, the playgrounds of the children of London might have been to-day *twice as large* as they are.

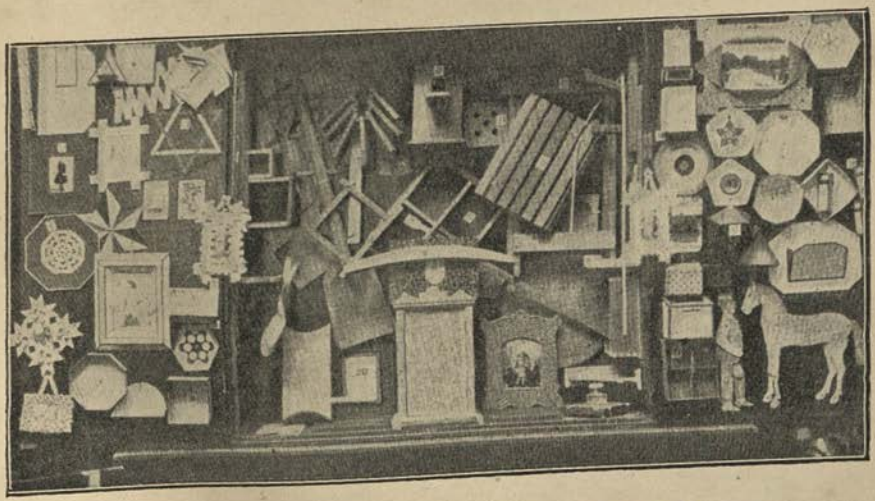
Other examples showing similar discrepancy and equally convincing as to the great value of reservation of ample space from the outset might be instanced—as, for example, parks and open spaces; these have hitherto been provided by individual munificence, or at enormous expense to the community. In this, again, the cost of reserved land would be nominal, and the interest and amortization charges upon such reservations—even though they be, as they should be, upon the most liberal scale—would, it will be observed, amount to a scarcely noticeable factor in the subsequent annual expenditure of the new cities.

Practical difficulties, moreover, arise in the carrying out of the system which would not be experienced in communities restricted to reasonable

proportions. To secure efficiency, regularity of attendance is of paramount importance, but in large towns the difficulty of securing such attendance is very great. In London the magnitude of the problem to be coped with may be gauged from the fact that the average number of children attending school is 146,000 below the number on the books. Another abuse of the system arises from the facilities found in large towns for migration from school to school, a process amounting in some cases to more than half of the scholars. This, apart from being fraught with disadvantage to the child and throwing extra work upon the teacher, is often used as a cloak to improper practices. For example, a careless father or mother neglects to send a child to school; the matter eventually gets discovered; the time of the officer is wasted in investigation, and the excuse is that the lad has no boots. Charity quickly remedies this and he appears, only shortly to disappear, and with him the boots into the pawnshop. To prevent trouble arising from non-compliance with a threatened summons, the lad is re-equipped and sent to another school, and so on. A valid excuse so frequently securing the non-attendance of girls, and hence loss to them of instruction, is that they are required at home to mind the baby. This is a flaw which could be conveniently obviated if the crèche were situated close to the school or one embodied with it, a plan which has in one or two instances been resorted to.

The Sewing-school, Agneta Garden Village, Holland.

Kindergarten.



Articles made by Pupils in a Manual Work Class.

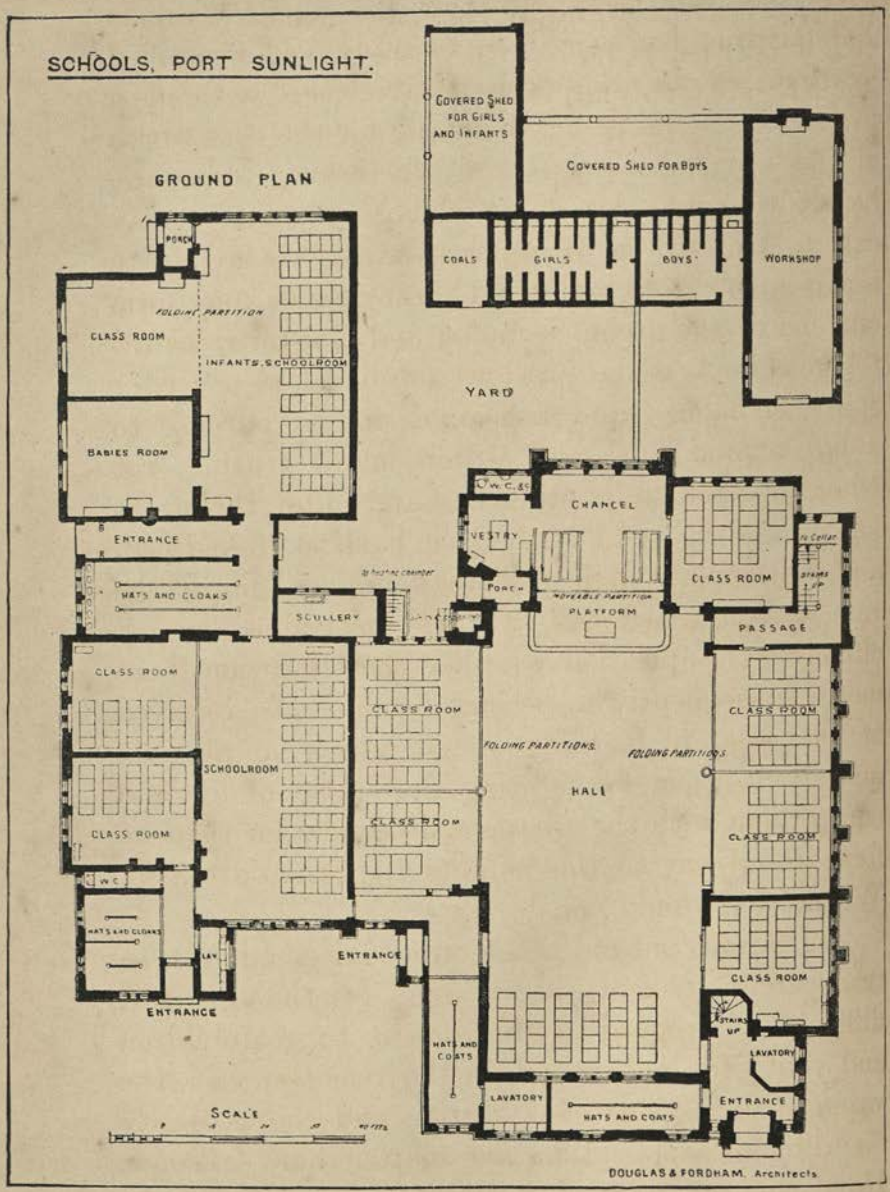
Other educational advantages, it will occur to the reader, could be made to accrue from the constitution of the cities as proposed.

One cannot pay a visit to a Board school and witness the intelligence-producing machine in its working and the units upon which it is operating with greater or lesser efficiency—the earnest worker imbibing and usefully assimilating what is veritably 'the milk of human kindness,' shoulder to shoulder with the inapt unit upon which the machine is uselessly expanding its force, the one eagerly stowing away in that marvellous cerebral accumulator facts which, though intrinsically simple, will a few years later enable him to outdistance his neighbour there, furtively glancing at the hands of the clock with only one wish, that for the passing of the time—without feeling that a grave responsibility rests upon the shoulders of those who may have travelled so far through the journey of life as to enable them to appreciate in its full significance the vast individual and national value of the work there being carried on. He cannot witness the dispersion of those units without reflecting upon the varied effect upon themselves and their country, of their diffusion throughout its length and breadth. The majority will leave that room as if they were escaping from a period of incarceration in durance vile. Out they will go like a pent-up flood broke loose—like a veritable avalanche, singing, shouting, shrieking; legs, eyes, arms all in vivacious developing action. Though the

sun may be hidden behind the dense 'flags of commerce' belching forth from the chimneys of the factories in which their fathers and mothers may be at work, still, their hearts are full of the sunshine of youth. Down the stairway they rush with the impetuosity of buoyant childhood, like a cascade of human fragments detached from a mountain of latent energy, borne down on a soft bed of snow-like innocence. So must they all rush down on Time's swift avalanche to the cold, undeviable stream of life. How many of them will breast it, stem it, make headway against it, and come out of it at its head—the summit of respect and success? How many will drift down it to strand, before they have gone too far, on an islet which will save them—on soil which will maintain them amid the vast population of mediocrities? How many of them, alas! will mistake life's stream for a stream of pleasure, and will drift unconcernedly, swiftly down until, when too late, they find themselves in the great, the pathless ocean of degradation and despair!

If we are to do our duty by the human components of such streams, for ever merging with our active reproductive units, we must, above all things, strive to insure that the instruction imparted to them shall be of the most practical kind, that best calculated to assist them in the battle of life, to make them efficient units in national reproduction, thereby to repay the State for the expense incurred in the giving of such instruction.

Schools at Bedford—Exterior and Interior.


SCHOOLS, PORT SUNLIGHT.
GROUND PLAN
COVERED SHED FOR GIRLS AND INFANTS
COVERED SHED FOR BOYS
COALS
GIRLS
BOYS
WORKSHOP
YARD
PORCH
FOLDING PARTITION
CLASS ROOM
INFANTS SCHOOLROOM
BABIES ROOM
ENTRANCE
HATS AND CLOAKS
SCULLERY
W.C.
CHANCEL
VESTRY
PORCH
MOVEABLE PARTITION
PLATFORM
CLASS ROOM
PASSAGE
CLASS ROOM
SCHOOLROOM
CLASS ROOM
CLASS ROOM
CLASS ROOM
FOLDING PARTITIONS
HALL
FOLDING PARTITIONS
CLASS ROOM
CLASS ROOM
CLASS ROOM
W.C.
HATS AND CLOAKS
LAV.
ENTRANCE
ENTRANCE
HATS AND COATS
LAVATORY
HATS AND COATS
STAIRS UP
LAVATORY
ENTRANCE
SCALE
DOUGLAS & FORDHAM. Architects.

No one can roam through the ancient courts and quadrangles, sacred to learning and sanctified by time, of our venerable Universities without a feeling of reverence for them and for the vast worth of the learning they, during their long existence, have dispensed—learning which we to-day may call to our aid as it reposes latent, yet ready to hand, in the great mullioned library which may form one end of the green, secluded and cloistered court. 'A good book is the precious life-blood of a master spirit, embalmed and treasured up, on purpose to a life beyond life,' said Milton in all truth. Yet when we stroll to its other end and enter the great hall where the great of the past have so often dined, and contemplate their pictures hanging against the rich, age-darkened oak, we are constrained to ask ourselves the question whether the education those men—subsequently to become so eminent—received at that seat of learning would to-day at all adequately fit them for fighting the battle of life and equip them with the weapons necessary for them to force their way to the heights they then attained. We know it would not.

You cannot put old heads on young shoulders—a transparent truism—hence one of the greatest difficulties in regard to education is to get children and youth to understand, in the remotest way, the value to themselves of education and the necessity for diligent application, no matter how irksome. How can the requisite diligence, so essential, be

secured? It can come only in one of three ways—(*a*) through an innate sense of duty, (*b*) through the spirit of emulation, and (*c*) through making education pleasant and attractive. Of these, obviously the latter, in regard to the great majority, is the most efficacious. But the value of an educated mind is seriously discounted, from the point of national utility, if it be not contained within a healthy body, whilst socially it is worse than valueless if erudition be not accompanied by moral rectitude. From such considerations it is clear that neither to fulfil national requirements nor the exigencies of social well-being will a mere literary or scientific education suffice, physical and moral training being of equal importance. The question is whether the physical side, together with such expedients as are calculated to have the requisite moral influence, could not be made to form the desirable 'attraction.' That cleanliness is next to Godliness is a proverbial truism, and it is probable that this should be the starting-point for moral elevation. *Mens sana in corpore sano* is assuredly the desideratum to be striven for. But the sound mind cannot be found in the healthy body if the latter be not efficiently nourished. Therefore the feeding of the body would appear to be the starting-point for both physical and moral training.

The value of the physical side of education has long since been intelligently appraised abroad, most notably in Sweden and Germany, and there is

gratifying indication that greater importance is now being attributed to it in Great Britain in connection with middle-class education. But if one reflects upon the state of things existent in regard to the education of our poor, we find it to be largely opposed to efficiency in all three departments—literary, physical, and moral. Whether through laziness and indolence upon the part of dissolute parents, or from *bonâ fide* poverty, a large percentage of our children are sent to school breakfastless, a larger proportion improperly washed, and probably the whole without the morning's bath. Reflect for an instant upon the effect of this in regard to efficiency. How can it be expected that the starving child can either settle down to work, or that the efforts of the teacher can have any adequate effect? Reflect for an instant upon the moral effect. There is brusque truth in the old doggerel:

> 'Hungry stomach, empty purse,
> May be better—can't be worse.'

Is it not absolutely natural that school should become repugnant to the child, that brute instinct should lead it to roam the streets instead, to beg, and lastly, though almost as naturally—and quite excusably—to steal? Now imagine the preliminary to the day's schooling to be a comfortable breakfast. Would not this in itself abolish truancy, so seriously opposed to the boon of free education? Would not this remove the repugnancy? Would not this be a potent factor in providing the desirable 'attraction'?

Moreover, from the point of view of efficiency, would not the rendering of both frame and mind to the acquisition of knowledge be equivalent to material extension of the course of instruction?

But the cost! that perforce is the point at once presented to the thinker. I have referred to the paramount importance of practical instruction, and also to the necessity of short hours of work, or the equivalent, as regards exhaustive effect, variety of work. One is here dealing with the education of the poor, and one knows that a huge amount of preventable distress has arisen from neglect to teach all and everyone a trade process of some kind. The question to be seriously considered is whether the expedients had recourse to to relieve monotony, in themselves so desirable, and the measures taken to impart knowledge of trade processes, in themselves so necessary, could not be made remunerative, to the small extent necessary to reimburse the expenditure on food. Every scholar should, I contend, receive a good breakfast and a substantial mid-day meal. To provide such to *individuals*, were it done at their homes, would be so expensive as to be impracticable—for individual feeding is a most uneconomical process. To feed a number collectively, however, in a plain, simple, and wholesome manner is surprisingly economical. The cooking of the meals should be utilized in imparting practical instruction to the elder girls, who should be made entirely responsible for the cooking, service, and

washing-up, the boys taking turns in service amongst themselves.

Now, if literary and scientific instruction were confined to the mornings and practical and physical instruction to the afternoons, is it too much to expect that the pence requisite to defray the cost of the meals could be derived from the results of the practical work? I am convinced that this could be easily effected by a system suitable to the attainment of this end. This would be easily practicable in regard to the elder scholars, and the surplus would go towards the nutrition cost of the younger and infants. To combine this training with earning, the elder students would, during the afternoon, work in a properly-equipped workshop, and thus assist in the general reproductiveness of the country; the goods produced would be sold at ordinary market prices, and the profits devoted to the cost of nutrition. The workaday population could not either conscientiously or validly object to this course, because if the lads, instead of thereby obtaining properly supervised practical instruction, earned a small amount extraneously instead, this sum would need to be spent in precisely the same manner—viz., the purchase of food. It might be thought that the earnings of school children during instruction in this manner would be insignificant, but that would be far from the case. Nationally the net earnings (not salary) of each useful producer are now over £200 per annum—say £4 per week. But the

gross earnings obviously must be greatly in excess of this. In order that a firm or master may obtain any income, it is clear that each operative must not only earn his wage, but also his proportion of the current expenses of the establishment. The difference between the cost of raw material *plus* the cost of all labour and work put upon it during transformation into the finished article, and the selling price of that article, represents the profit in the ordinary way. Of the aggregated cost, the component of labour, represented by wages, is by far the greater. Now, in the case under consideration the wages would be non-existent, and this considerable factor would more than outweigh the inefficiency of juvenile and student reproduction. Thus, I contend, whilst varying the monotony of school-life, pleasant and brain-brightening work on the part of the boys and girls could be made to pay for their daily nutrition. Nothing would influence the diligence of the students more than to have this carefully explained to them, especially if, by means of a simple bonus method, prizes of value were given to them for their industry. But, even in their regard, by proper systematic control, a return could be obtained. It must be remembered that the cost of feeding very young children collectively is very small (see remarks under 'Crèche'), and also that their utility in earning money—in trade processes—even at most tender years, commencing at four, is such as to lead to

their being kept away from school for this purpose. In regard to infants, there is no question that the admirable system of the Kindergarten, introduced from Germany, has most beneficial results from the point of view of 'attraction,' and that simple, pleasant and brightly-coloured work could, at an early stage, be given them which, whilst being remunerative, would prove even more attractive to the youngsters than making 'mud-pies.'

The teaching of the dexterous use of the fingers and hands cannot be too soon entered upon, for then all digital and manual operations are acquired with great ease and facility. In this relation let me put forward a plea for the teaching, commencing with infants, of ambidexterity. No child should be allowed to grow up abnormally in regard to the use of its limbs, because it happens to be born 'left-handed,' for the individual becomes hampered through life by reason of tools, appliances, implements and machinery being invariably arranged to be used in a 'right-handed' manner. On the other hand, people should welcome the arrival of left-handed children, for the reason that it is so much more difficult to teach normal children to become left-handed. Ambidexterity should apply to all ordinary operations, including writing. I have often had occasion to envy the advantage of a friend, who, when he is tired of writing with the right hand, unceremoniously shifts his pen into the other hand and continues to speed on, the break in the

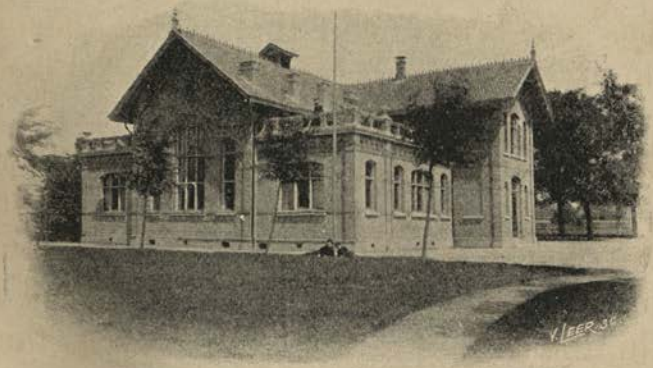
writing where the change took place being quite undiscernible. The value of such teaching to the industrial classes in case of dextral disablement need not be expatiated upon. To foster the idea, prizes should be offered for left-hand work.

Such practical work would with advantage be carried on in the open air—preferably upon the roof-garden of the school*—and this, added to an ample amount of physical exercise and drill, would go far to stem the down-trending stream of our national physique. Nor should it be thought the benefits derivable are only physical; experience has shown that the intellect is concurrently brightened. Physical training, it has been demonstrated, not only abroad (see Appendix), but also in our own country, makes children more intelligent generally, quicker at their mental work, and more resourceful. It has also been found that, whilst the time taken from other studies in no way impeded the students' progress in those studies, but, on the contrary, quickened their grasp of new ideas, physical training had the effect of exciting the interest of such children as showed signs of possessing a particularly lethargic temperament, and to stimulate them, as nothing else had done, to work at other things.

As to drill, this should be led up to through outdoor games. On this the Educational Committee arrived at the following: 'It is desirable that more

* See Chapter IV., and reference in this chapter to saving which might be effected in London.

School Children in a Continental Garden Village.



The 'Community' or Club Building, Agneta Gard en Village, Holland.

Men Gymnasts of a Garden Village.

Girl Gymnasts of a Garden Village.

attention should be given, with the assistance, where possible, of voluntary agencies, to organizing games for school children, and for that purpose much greater use should be made both of school and public playgrounds than at present. But the Committee are of opinion that no scheme of games alone can ever be made general enough to supply the place of methodical physical training, and they hope that a regular course of physical exercises will find general acceptance with Local Authorities. While they consider that such exercises should, when possible, be taken in the open air, they would urge upon Local Authorities the expediency of providing playsheds or rooms other than the ordinary classrooms in which the exercises may be conducted regularly.' As regards drill, we, as a nation, do not, and never have, placed anything like adequate value upon its importance. Discipline, the ability for smart, concerted action and respect for superiority of rank are immensely important factors in the welfare of a nation largely neglected by us. With the drill of children we obtain the combination of the inculcation of discipline with improved physique and more becoming manners and gait. Laxity in manners and a slouching gait are unhappily characteristic of the British lower orders. Sweden, as has been pointed out, was the birthplace of physical training; one sees the result to-day in the general deportment of the populace. It reveals itself in the simplest of everyday occurrences. 'Having regard

to the enormous value of the physique of growing lads,' says the report of the Committee, 'and to the possible saving of expenditure in other directions resulting therefrom, the committee are of opinion that some grant should be made from the national exchequer in aid of all clubs and cadet corps in which physical or quasi-military training, on an approved scheme, is conducted, subject to public inspection. Lads should be made to attend evening continuation classes, in which drill and physical exercises should take a prominent place.'

There is much truth in the saying that the Battle of Waterloo was won in the playing fields of Eton. But the Battle of Waterloo was fought at the commencement of the last century, not this. In the interim great changes have taken place in foreign countries, and it is meet that we, too, should change our methods. In connection with the present Russo-Japanese War a celebrated French General recently compared the Japanese—in whom discipline and appreciation of science are marked traits—to the Germans at the time of the war of 1870. It was then said that the French were beaten by the German schoolmaster; to-day, says the General, 'it may be said that the Japanese schoolmaster has been victorious over the Russian pope or priest.' The changes, moreover, that have taken place have taught us that mere weight of fighting material and multitude are of small avail—indeed, the latter may sometimes tend to disaster. Summing up the lessons 'which no nation can afford to overlook,'

and writing upon the same subject, the Italian *Tribune* says : 'The enormous bulk and physical strength of Russia—and, we may add, of America —are seen to be of little avail in themselves. They must be animated by an enlightened spirit, by education, and by constant training.'

Recurring to cleanliness, the proper ablution of the person should be carried out and supervised at school. Each school should be furnished with a lavatory consisting of a large room, in glazed brick, around which would be a series of double hooks, corresponding to the number of scholars, enclosed in cupboards having wire doors, sliding in vertical sashes. In front of these cupboards, forming a passage and affording sufficient space for undressing, would be a dwarf wall of glazed brick about 5 feet in height. Along the top of this wall would pass a water-pipe furnished with numerous nozzles projecting downwards at an angle of about 45 degrees. The children, in the order of their respective odd numbers, would file into this room and stop opposite their own hooks. There, divesting themselves of their clothing, they would pass round to the enclosure formed by the dwarf wall, each stopping opposite a nozzle, beneath which would be found a wire basket containing soap and brush. Having lathered themselves down, they would stand beneath the douche formed by the nozzle and then immediately pass to a plunge-bath. The even number pupils would then be admitted, and so on.

The plunge-bath would be considerably deeper than the height of the scholars, but it would be furnished with stout manila ropes floating and stretching from end to end of it. Along this the children who could not swim would scramble—but familiarity with the process would soon breed contempt for the ropes' aid, and in most instances it would be unnecessary to teach swimming, except to correct faults. Arrived at the other end, they would go to triple hooks, bearing their own numbers, and, taking their rough towels, dry themselves and dress in a school-dress they would find hanging there. This should consist of a flannel shirt and a costume of washable material, such as brown holland, woollen socks and dry shoes. These operations should occupy ten to twelve minutes, when the scholars would pass into the drill-ground for about fifteen minutes' smart physical exercise, and thence to breakfast.

If we ask ourselves why, during the last quarter of a century, in so many of our industries we have been rapidly out-paced—why, for example, Germany should supply us with nearly all our chemical wants and fulfil our industrial needs, to the displacement of the British workman; why, moreover, chemical processes that actually had their birth in our country have flourished under the care of the Teuton, but languished in the hands of the Briton, and even become extinct—apart from the attitude of labour—the undoubtedly correct reply is *our neglect of*

science. Our competitors had the prescience, which we lacked, to foresee that, following on the footsteps of rapid advance in scientific discovery, and the understanding men of science were acquiring, by their study of pure science, of the forces of Nature, ere long great benefits would accrue from *applied science*—in other words, that the value of the researches of the scientist would become apparent in the achievements of the technologist, as one by one he applied science to industrial operations; annihilating one by one the uncertainty and disappointment of 'rule of thumb' processes of every nature, and rendering every operation directly amenable to the scientific principles underlying it. The aim of the pure scientist and the duty of the applied scientist are quite separate and distinct; the one by research to discuss the fundamental laws and principles of science, as it were an analytical process; the other, by suitable pupilage, to assimilate—a synthetical operation, as it were—these laws and principles to the processes of reproduction and the operations of daily life.* The pre-eminent position of our own men of science was acknowledged the world over, yet their warnings fell upon deaf ears in our own country, whilst

* It is now some eight-and-twenty years since I spent some enjoyable hours with the late great scientist, Professor Helmholtz, whilst he showed me through the State-maintained 'research' laboratories in Berlin. Even to-day we have not a similar State-maintained laboratory devoted to research.

others, foremost among them the Germans, set to work to train up a class of men it was seen would be required to carry out the work.*

To be perfectly fair and accurate, one should not omit to point out that strenuous efforts to provide apposite education for the class of men—technologists—it was seen would be required by the country were made at an early date, and the munificent pioneer work of the City and Guilds of London in this regard is beyond all praise. But, on the other hand, one should not omit to point out that the lethargy of our manufacturers, employers of labour, machinery, chemical processes, and such-like, the class of men for whom these applied scientists—engineers, electricians, chemists, electro-technologists, etc.—were, at great expense, being got ready, has occasioned great disappointment. In Germany every works is amply provided with these technical scientists; their Ph.D.'s are ever busy, not only in examining the raw material passing in, and detecting adulteration of the chemicals, dyes, reagents, and vehicles of transition, but in watching, with an eye to improving them, these processes of transition or

* Professor Ayrton informs me that England was before the Continent in the establishment of a technical institute *per se*. This, it will be remembered, was brought about by the munificence of the City and Guilds of London. But, it must also be remembered, the Technical High-Schools at Charlottenburg and elsewhere have been in existence a long time. These receive Government grants, and this to an extent to put into the shade anything done by our country.

'manufacture,' also of preventing waste and turning into profitable account bye-products which with us had been, and unfortunately continue to be, cast away as refuse. The result has been already referred to, but, unhappily, the lessons are taken but tardily to heart.

This, then, brings one to the consideration of the teaching of science in schools, an important subject which, however, one must not pursue here further than to say that in its present form it is wholly unsatisfactory. For the science of the school is not that of the works. It possesses, indeed, the idiosyncrasy of the Latin of the Universities with a similar defect that it requires to be all learnt over again. What is wanted in the school is that the elementary science taught should be more useful afterwards; whilst what is wanted in the college is scientific instruction within its walls in combination with application of it in a practical manner without. In this relation it is easy to estimate the advantages which could be made to attach to the colleges in Garden Cities. Take, for example, the teaching of agriculture, horticulture, floriculture, botany, forestry, land surveying, geology, etc.; the value of the morning's class-work with the afternoon's field-work would be inestimable. To many minds the study of science, though so important, is 'dry,' but this at once disappears when the practical side is introduced.

There are many points in this relation one would

wish to touch upon, but I must content myself with but one—I refer to the great value of teaching the scientific principles underlying the operations of daily life. This is a matter of great importance in regard to health. The lad of common-sense, whether he be preparing for some wholesome athletic competition or only occupied in ordinary work, would be the less likely to do foolish things, things inimicable to his health, if he had been instructed in the principles of physiology. The girl would be more likely to be more cleanly with her culinary utensils if she had been taught that by neglect she might poison herself or her family; the housewife would be more careful in various practices if she were shown that such were dangerous and might result in disease in her house. To be merely bidden to do a thing, or warned not to do a thing, carries far less weight and produces a far more fleeting impression than if the reason underlying the advice or prohibition were explained and the scientific principles underlying the matter demonstrated in a simple and intelligible manner.*

* Early in the present year the Evening Continuation Schools Committee of the London School Board decided to arrange a series of lectures on health in a number of schools. Twenty weekly classes were started, selected medical practitioners acting as lecturers. In a report upon this it is stated that the experiment has been entirely successful, and the lectures are desired in many more schools. The pupils have varied in age from fourteen to eighty; many married couples and young people have attended, and the attendance has averaged over 600 each week. The

One cannot but think that the advent of the 'lady doctor' is fraught with great potentialities in regard to the hygienic conditions and happiness of our working population. Their kindness of heart will probably carry them to, and secure a welcome for them in, many thousands of dwellings, the inhabitants of which had never seen the inside of a lecture theatre, and whose grade of intelligence would avail them little by a course of lectures. And their 'hints on health' in the house will be taken with due respect from the source whence they come, whilst directions concerning the preparation of food would doubtless be acted upon to the benefit alike of the health of the offspring and the household purse. 'Improper feeding is a far more potent cause of starvation among the children of the poor than

popularity of the lectures has been due, without doubt, in a large measure to the fact that each lesson was made as practical and elementary as possible, and a strictly non-technical, graphic treatment of the subject was given. In order to bring the lessons home to the pupils, and to appeal to the eye as well as to the ear, part of each lecture was devoted to simple experiments. These, experience has shown, have been both telling and helpful.

One lecturer believes that the lectures will be 'a potent means of arousing a *sanitary conscience* amongst the masses of London,' whilst Dr. Collins, who organized the series, has stated that 'the practical result of this work will be the dissemination of knowledge of the laws of health. Instruction given in these classes will ultimately be far-reaching, and will do much to raise the standard of health of the community.'

insufficient feeding,' says Mrs. Bosanquet, 'and if the benevolent people who every winter flood the East End with soup would, instead, devise some way of teaching the women simple cooking and the elementary laws of health, they would soon see better results from their work.'

Popular ignorance of sanitary science is both widespread and colossal. Year after year thousands of infants' lives are sacrificed, not from any lack of maternal tenderness, but from want of knowledge. For the five years ending in 1900, 156 out of every 1,000 infants born died within a year. One infant in every six dies before it reaches its first birthday. This terrible death-roll has been going on for the last fifty years, and is as large to-day as ever. Nor is this all. Many of those who survive come into the struggle for existence—a very real struggle in the case of the poor of London—with constitutions so impaired that their lives are not a source of strength, but a burden to the State.

Who can be less well adapted to be a working-man's wife—though otherwise, perhaps, admirably eligible—than a domestic servant, who has picked up her notions of cookery from what she has seen in the kitchen of a rich man's house? Yet the health of a nation depends largely upon its cooks and cooking, and thus both the individual and the subject possess far greater importance than is generally ascribed to them.

Probably the reflection never strikes the mistress

of the house, and certainly never the domestic cook, that she possesses in her kitchen a more or less perfectly-equipped laboratory, where the most delicate and beautiful chemical processes and experiments are daily carried out. The kitchen is, unhappily, the last place where one would look for science; nevertheless, the proceedings of even the least experienced cook are regulated—although she knows it not—by the strictest scientific principles, and it is the universal ignorance of even the most elementary and fundamental of these laws that is responsible for an enormous waste of food and fuel. The time has not yet come—though it surely is not far distant—when at least a modicum of chemical knowledge will be required of every cook; but at present we are content to leave our domestic economy—and what is more, our digestive organs—to the care of servants whose training is entirely based on rule of thumb, tempered by such superstitions as have been handed down in the kitchen for hundreds of generations. So crystallized have certain customs become by right of long and established usage, that to question their perfect wisdom seems nothing short of revolutionary. Nevertheless, a very little experimenting may show that even the commonest are too often based on wrong principles. Take, for example, that simplest of all culinary feats, the cooking of an egg—the 'boiling' of an egg, as the expression invariably has it. To state bluntly that to boil an egg for the orthodox three and a half minutes is a highly im-

proper mode of procedure would doubtless shock the feelings of the domestic cook, but it is none the less capable of immediate proof. Place a small quantity of raw white of egg—the simplest form of albumen—in a test-tube; place the tube in a vessel of water, and gradually heat it, gauging the temperature meanwhile with a thermometer. As soon as the albumen attains a temperature of approximately 134° F., white fibres will be first seen to form within it. These increase rapidly until about 160° is reached, when the whole mass becomes white and nearly opaque. If this substance is now examined and tasted it will be found tender, delicate, jelly-like, and eminently digestible. Continue the experiment, however, by heating the albumen till boiling-point is reached, and keeping it there awhile and it will dry and shrink and become horny; while if the heat is carried a little further the result is a substance so hard and tough as to be quite unsuitable for human digestion. To go a little further, a similar experiment tried with the yolk of an egg will demonstrate the surprising result that this coagulates at a lower temperature than the white. When eggs are cooked in an ordinary way, the three and a half minutes' immersion, though the water be boiling, is insufficient to allow the heat to pass fully to the middle, and therefore the white is subjected to a higher temperature than the yolk. The perfectly-cooked egg, where the yolk and white alike are tender and digestible, is, as personal experience

will readily show, one that has never been boiled at all, but has been allowed to remain for ten minutes or so at a temperature between 30° and 40° below the boiling-point.

What applies to the simple operation of 'boiling' an egg is applicable also to the still more simple process of 'making a cup of tea.' The present mode of tea-making—especially when teapot and tea-leaves, as we are told, stand upon the workers' hob the day through—is eminently unscientific. The good old-time lady who has her tea infused in an earthenware pot and *at once* transfers the decoction to her handsome silver pot, the inside of which she does not desire to defile with nasty brown fur, does a scientific thing, yet she may not understand the principle involved. She brews the cup which cheers her, and she does not perform the unnecessary and harmful chemical process of tanning within her.

All this is very simple when properly explained, and the great charm and value of science teaching is that one may be led up by imperceptible steps to things more complex and more important. Thus this same peculiar semi-fluid albumen is the basis of the juice of all meats, the cause of their varied flavours; and when we have learned something of its behaviour in regard to the egg, we are the better prepared to estimate its value and accord it proper treatment in the scientific cooking of meat. Then we are taught concerning its small value as a nutrient *per se*, and its great value in combination

with fibrin; the trained nurse knows its shortcomings and value in regard to the beef-tea of her patient; the housewife its peculiarities; whilst the poor mother may no longer throw away the principal nutriment of the few scraps of meat she has been able to boil under the impression that the 'water' is no good.

The careful assimilation of the culinary art with scientific principles is also likely to be productive of great economy. Quite recently a process of quick and economical bread-making was demonstrated publicly in London. By the present method of bread-making from eight to fourteen hours are required to prepare the dough for the oven, but by the new process this can be done in about an hour and a half. In this process the baker, after having made a mixture by dissolving 5 ounces of flour in 2 quarts of water, calling it creamed flour, raised its temperature to 160° F., and then reduced it after a few minutes to 95°; 6 ounces of yeast were added. This liquid compound was then absorbed in 28 pounds of flour, and, after some manipulation in the ordinary way by the baker, the dough was ready for baking. The process has fulfilled expectations both as to the time occupied and the result attained. Among the advantages, we are told, are that it gives an increased yield of from five to six loaves from a sack of flour, that the quality of the bread is sweeter and sounder, and that it yields a substantial saving to the baker.

This digression has been made for the purpose of emphasizing the value of *practical science* teaching, whilst it serves to show, especially if the gradual increment principle be observed, how interesting—nay, fascinating—it can be made for the student.

In regard to the industrial classes, it is above all things necessary that the instruction given should be practical. But this should not be confined to the student ; the instructors themselves should be practically instructed and able to skilfully demonstrate manually. Indeed, that a teacher should be absolute master of his work manually is the only way to inspire respect in the student. I remember an episode which might be cited to give point to this. The students of an engineering school had sat out a long course of lectures upon roof construction, in which somewhat recondite 'graphic statistics' were made great use of by the professor. These students were subsequently being conducted through a large foundry, when that same professor stumbled over a casting, the peculiar shape of which aroused the interest of students and instructor alike. Asked what it might be, the professor was unable to say ; all the same, it was an angle-casting belonging to a roof.

But what applies to teachers applies equally in the case of masters and mistresses. The cook in the kitchen has no real respect for the dictates of her mistress if she detects that the latter has no real knowledge of cookery. If, however, the mistress demonstrates her practical acquaintance with the

subject, in regard to which she gives instructions, by occasionally undertaking some part of the practical operation, the respect becomes sincere. 'The bad workman complains of his tools,' and I have always found that verbal explanation or argument avails little; the best plan is to doff the coat and practically work the machine for an hour or two. This at once carries conviction and commands respect. This done, if it be obvious that the complaints were a mere shifty device, the episode is best concluded by the discharge of the operative. Again, what is true of industry should become applicable to ordinary life, and in this connection it is gratifying to observe that the recent and extensive introduction of motor vehicles is having the effect of bringing forward a race of practical men—and even women—amongst the well-to-do; for one finds them not only acquiring mechanical knowledge, but donning 'overalls' and engaging in the practical operations of adjustment and repair. In every sphere of life the ready use of the hands and the knowledge of tools and their uses is valuable. The ability to drive a nail—to hit it fairly instead of the thumb—is always valuable in every grade and at every stage of life. To be able to render 'first aid,' as it were, mechanically, as well as medically, might often stand one in good stead, as for example in stopping a burst water-pipe, whilst it removes the helpless feeling experienced by the impracticable when the workman has to be called in.

Lastly, if properly systematized, the teaching of

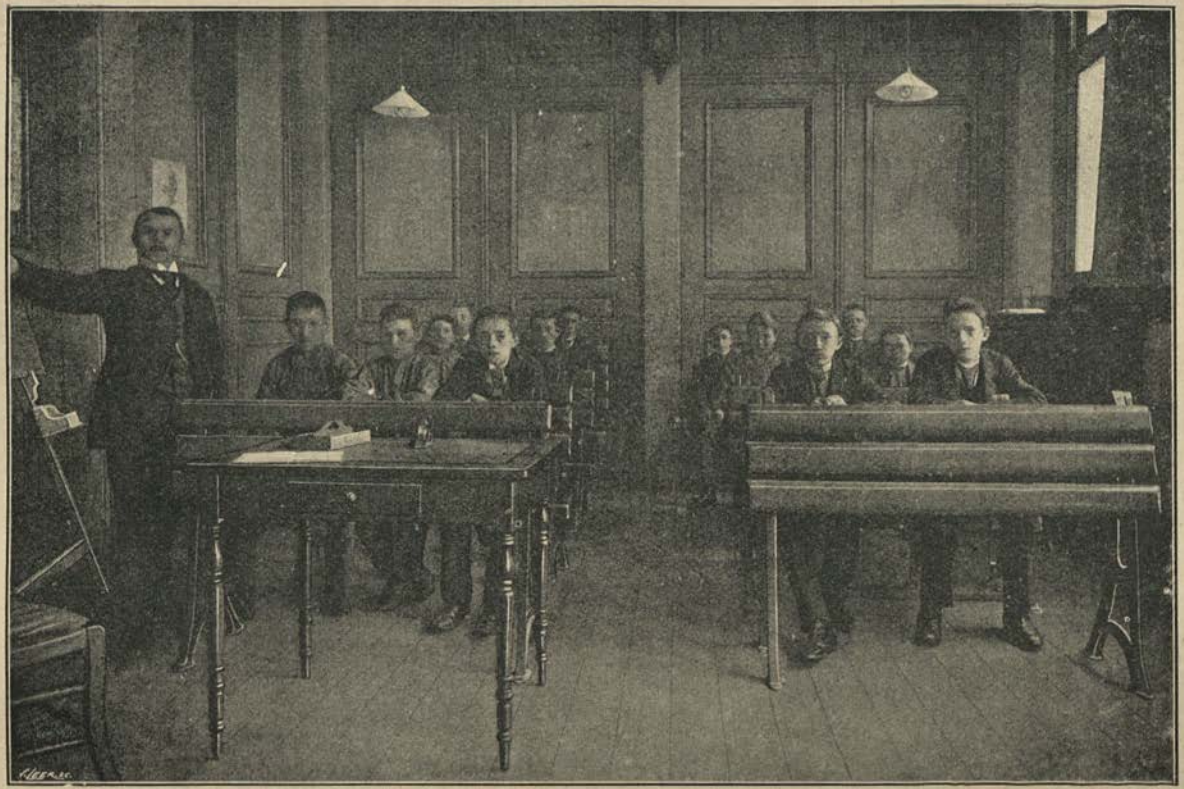
handicraft can be made materially helpful in conjunction with oral instruction. Bearing upon this, the recently expressed views of that eminent authority on such matters, Sir Philip Magnus, might be cited. He said that 'It was not until the fact was recognised that many subjects of instruction might be taught in connection with workshop training, and that the methods of the workshop might be made applicable to the teaching of other subjects, that manual instruction would find its proper place in our elementary and higher schools. To this end the instruction must be continuous from the early kindergarten exercises till the boy or girl left the school. Hitherto the materials of manual instruction had been wood and iron. But if the instruction was to be continuous, other materials and other methods than those at present adopted must be employed. The manual instruction must be made the means of progressively developing the child's intelligence, and of providing subjects for inquiry and thought in the region of elementary geometry, arithmetic, and mensuration, and, to some extent, in the rudiments of natural and experimental science, from the earliest age throughout the child's entire school career. Only a small part of the manual training-field had so far been systematically surveyed. At present the course of manual instruction in all our schools was discontinuous and broken. Between the age when kindergarten exercises ceased and the time when a boy was fit to pass to wood-working

tools—*i.e.*, roughly, between the ages of eight and eleven—a boy received no instruction by manual methods, except, perhaps, in drawing, and relied almost exclusively upon oral teaching. Methods of instruction had to be discovered and materials for workshop exercises had to be suggested, which would serve to utilize this unemployed interval. In connecting these two periods care must be taken that the secondary influence of manual instruction should also be continuous—that the training in observation, measurement, and reasoning, should be developed by appropriate exercises for each successive year. In the training of girls much had to be done in this direction. Except as regards sewing, which, although in some cases useful for boys, was essential for girls, the manual instruction for girls from eleven or twelve years onwards should be largely, if not entirely, associated with the domestic arts.'

A disappointing feature is the percentage of those who cannot be made to reap the benefit of our present educational system. Things, however, are far better than they were half a century ago, when ragged schools were the only means of imparting fragmentary instruction, and when it was estimated that the attendance of the lads only averaged a couple of hours per week. At that date hordes of semi-naked children roamed the streets of towns, leading a nomadic life, sleeping in dens, and living on beggary and theft. To-day much of this has disappeared, but the gipsy nomads are allowed to

Exterior of the Technical Institute, Port Sunlight.

Assembly Room in the Technical Institute, Port Sunlight.



Village Evening School at Delft.

remain—a class of people who can with impunity defy both sanitary and educational laws.

Turning to the commercial side, here again the essential is practical as opposed to academic instruction. For example, one may engage fifty clerks and typists, all of whom will satisfactorily take down from dictation and execute in efficient manner a letter; but not one of these, if given the heads of a reply to a letter received, could indite a letter to embody those heads and produce a satisfactory and business-like reply. The art of a business letter is clearness and compactness combined with explicitness and sharp separation of the various matters contained in it. In other words, the art of a commercial letter should lie in its ability to bring the reply desired—*i.e.*, that each compactly-put question should bring forth an equally terse and definite reply. The subject of commercial letter-writing should certainly receive more attention. As another example, shorthand might be taken. This splendid modern innovation—which brought an obscure individual into such fame and secured him a knighthood—should be taught as early as possible, not left unnecessarily late, as is usually the case, often, indeed, delegated to the evening class attended by the tired clerk, whose salary is lessened by his ignorance of it. If taught early it becomes of double utility, for it can be made of immense benefit to the student whilst attending his lectures. Freehand drawing, again,

should not be confined to floral work and profiles, on the assumption, as it were, that the student must necessarily become an R.A. It should invariably be combined with the perspective of solids, so that a man in after-life might rapidly sketch any object of which particulars are required—a room, a house, a piece of machinery—in such manner that it may be dimensioned. On the other hand, labour might be saved in mechanical drawing by the employment of squared paper—introduced into this country, I believe, by Professor John Perry, F.R.S. With this not only can sketches be rapidly drawn, but such sketches are at once drawn to scale. Geometrical illustration—which should accompany as much as possible mathematical calculation, seeing that it appeals to the eye as well as to the brain—can be carried out with facility; whilst numerical results obtained, which whilst in the form of a mass of figures convey nothing in the form of a concrete idea, can at once be brought home to the understanding by being plotted as curves on suitably squared paper.

Book-keeping also should not be taught on the supposition that the system in which instruction is given is the *only* one and of universal adaptation, and that the student must necessarily himself become a merchant. But rather a thorough understanding of the principles involved should be imparted, so that upon these the clerk may build the superstructure according to the office he subsequently finds himself in.

Perhaps the most important point to be impressed —in connection with education in its relation to commerce—is the disability under which we suffer from *our neglect of modern languages!* It is no use sending commercial travellers into a country unless they know the language, and as long as our schools persist in neglecting—'I might almost say ignoring,' says Lord Avebury—modern languages, it will be impossible for mercantile houses to find suitable representatives. I have ventured to point out that the same course of instruction which sufficed to make active minds great in the past would not avail to-day. In those days, as also at the date when our public schools were first established, whilst natural science can hardly be said to have existed, there was but little difference between schools and grammar schools, and at that epoch a *quasi*-dead language was partially revived to form the vehicle of interchange of thought between scholars. At that time it was taught and spoken, but subsequently it continued to be taught but not spoken; nevertheless it formed the most important matter of education.

'Our education,' Charles Buxton wrote, 'too often consists in merely learning the words which dead gentlemen of 2,000 years ago would have used'; whilst Lubbock remarks, 'In our present system our boys are not taught to speak Latin or Greek, and as an acme of absurdity, as a precaution to render the instruction as useless as possible, they are trained to pronounce the words very differently from the

Romans or Greeks themselves, or indeed from the people of *any other* country, and even from the Scotch.'

For those who are to engage in the serious business of life, far too much time is still allotted to Latin and Greek, and the excessive amount thus expended has been both deplored and criticised from the time Milton wrote in his letter to Master Samuel Hartlib: 'We do amiss to spend seven or eight years merely in scraping together so much miserable Latin and Greek as might be learnt otherwise easily and delightfully in one year'; for, observing truly that 'though a linguist should pride himself to have all the tongues that Babel cleft the world into, yet if he have not studied the solid things in them, as well as the words and lexicons, he were nothing so much to be esteemed a learned man as any yeoman or tradesman competently wise in his mother dialect only.'*

During the last century there have been five Commissions specially appointed to inquire into,

* In the opinion of that learned and versatile *savant* Huxley, 'Education should enable a boy of fifteen or sixteen to read and write his own language with ease and accuracy, and with a sense of literary excellency derived from the study of our classic writers; to have a general acquaintance with the history of his own country, and with the great laws of social existence; to have acquired the rudiments of the physical and psychological sciences, and a fair knowledge of elementary arithmetic and geometry. He should have obtained an acquaintance with logic rather by example than by precept; while the acquirement of the elements of music and drawing should have been pleasure rather than work.'

or to deal with, educational matters, and it is most significant that all these Commissions made the same complaint, and offered similar suggestions. The first was appointed in 1861 to inquire into the management of our great public schools—Eton, Winchester, Westminster, Charterhouse, St. Paul's, Merchant Taylor's, Harrow, and Shrewsbury. After a careful inquiry, the Commissioners expressed their opinion strongly, in regard to modern languages, that more time should be devoted to the study of them, while as regards science, they reported 'with regret' that it was 'practically excluded from the education of the higher classes in England.' Strange, indeed, it is to read in this report that 'education is narrower than it was three centuries ago, whilst science has prodigiously extended her empire, has explored immense tracts, divided them into provinces, introduced into them order and method, and made them accessible to all.'

'Our present system of education, or rather half-education,' says Lord Avebury, 'is not the fault of the preparatory schools. They are dominated by the great public schools, and the great public schools again by the Universities. The Universities must bear the responsibility. They have, indeed, excellent science schools and eminent professors, but they treat the knowledge of Nature as an extra—an ornamental, but not an integral—part of education, not necessary for the degree. The lion's share of the prizes—exhibitions, scholarships, and fellow-

ships—goes to classics and mathematics. Naturally, therefore, the great public schools feel that they can spare but little time for science and modern languages, and as it is neglected in the public schools, it is almost ignored in preparatory schools.'

If we reflect upon the great change, principally due to the invention of the steam-engine, which has taken place during the past century, we shall at once see that matters should now be reversed. The 'lion's share' of attention should now be bestowed upon *applied* mathematics, technical instruction, and modern languages. The study of dead languages should be viewed more in the light of intellectual recreation, a delightful one, lasting through life; for in tracing the derivation of modern words we are taken back into the ancient world. Would we learn the opinion of commercial men on this important matter, we have only to read the resolution drawn up by the London Chamber of Commerce and passed unanimously by the Associated Chambers: 'That this Association greatly regrets the deplorable neglect of modern languages and science in our great public schools, and that a memorial be addressed to the Lord President of the Council urging him to take such steps as may be necessary to give effect in this respect to the wise regulations and statutes made by the Royal Commission on Public Schools, which was presided over by the late Archbishop of York, and of which the late Prime Minister was himself a member.'

Not only does our neglect seriously hamper us abroad, but mercantile clerical occupation at home has become acutely adversely affected; for, as a result of our present system, British firms are compelled to employ foreign clerks. A facetious young German, employed by a mercantile firm in London, is reported to have written home to his family: 'You will be sorry to hear that there are still some Englishmen employed in our office.' The trenchant sarcasm bears its full measure of truth; without doubt it is a serious matter for our clerks that English firms should be compelled to employ foreigners because our schools so sadly neglect the study of foreign languages.

A very interesting parallel has been drawn by Lord Avebury, who says: 'Perhaps the country where education is most honoured, where most time is given to it, and where honours and rewards, offices and appointments are most dependent upon the result of study, is the great empire of China. On the other hand, it will also be admitted that the stagnation of that great empire, and the backward condition of that clever and cultivated people, is greatly due to the fact that the Chinese idea of education consists of a knowledge of the Chinese *classics*, and does not include any study of foreign languages, or any knowledge of the world in which we live.'

Continental countries, especially Germany, have made vast commercial strides of late years, and such

advance is directly attributable to two things: (*a*) the *enforced* acquirement of foreign languages, and (*b*) technical instruction in their high schools. These are mercantile weapons the power of which we have never properly appreciated. 'To compete in commerce without technical education is like fighting a battle with bows and arrows against rifles and cannon.'*

I have endeavoured to show how very materially sound health reflects not only socially—on the happiness of the people—but nationally. Slight consideration will, in addition, serve to show us its great importance in regard to education. Obviously Garden Cities will stand at great advantage in this also; for, apart from the increased results obtainable from a given expenditure, by its very nature the construction of the towns will afford that great desideratum, healthy schools.

The ventilation of classrooms, says the Medical Officer of the late London School Board, in a report just published, is 'the most important sanitary question' connected with education, and in a solution of the difficulties it presents 'the most difficult task the engineer has to face.' Ordinary town air contains 4 volumes per 10,000 of carbonic acid gas, and a benevolent Legislature has laid it down that in cotton factories the proportion must not rise higher than 9 per 10,000. It is suggested that 10 per 10,000 would indicate 'defective' ventilation in a

* Avebury.

classroom, but even with the ratio at this point the majority of London schools, it appears, would be open to reproach. Experiments made in the Pocock Street School when the gas was lighted indicated an impurity of 15·5 per 10,000. It is open to argument whether lessons learned in an atmosphere as foul as this can produce any benefits commensurate with the physical harm inevitably caused by inhaling the poisonous gases.*

As civilization proceeds one sees more and more clearly that education should continue throughout the whole term of life. It has been well said that the life of an engineer must be one of continuous study; he must be ever instructing himself—and this energetically—to keep pace with the advances of science; he must, for all his career, feel himself still in the school of Nature—a college directed by the council of natural forces. But should not this apply to all professions? Should it not, indeed, apply to every intelligent individual? In this connection one cannot enter that *sanctum sanctorum* of our nation, wherein we can partake of that in-

Committee are emphatic in recommending that a systematized medical inspection of children at school should be imposed as a public duty on every school authority, and they agree with the Royal Commission on Physical Training (Scotland) that a contribution towards the cost should be made out of the Parliamentary vote. With the assistance of teachers properly trained in the various branches of hygiene, the system could be so far based on their observations and records that no large and expensive medical staff would be necessary.

estimable advantage of being able to commune with the living works of the dead—the precious life-blood of master spirits fled, embalmed and treasured up for us—the reading-room of the British Museum, without a sigh of regret for the great waste of nationally valuable time, the great loss in efficiency in the intellectual workers caused by want of adequate ventilation. There we see that the ardent students, though their wits, like a bunch of keys, are from constant use kept bright, are rendered semi-somnolent and dozing. The electric light burns brightly above their heads. Oh, that a few electric ozonizers could be interspersed among them and more fresh air poured in, that this lamentable loss of national time and talent might cease!

The teaching of the principles of science underlying hygiene, especially if, as I suggest, every opportunity be seized of carrying it into the dwellings, is of paramount importance; but the scholar will be less likely to be adequately impressed by them and led to put them into practice if he observe a failing to do so in his immediate surroundings. This point is so carefully dealt with in the Report of the Committee of the British Association of Science on 'The Conditions of Health essential to the carrying on of the Work of Instruction in Schools,' just presented to Section L (Educational Science), and so tersely put, that I feel I cannot do better than refer to it here.

The Committee stated their opinion that the sub-

ject of school hygiene not only offered excellent opportunities for practical work and testing methods, but also co-ordinated with nearly all other branches of the teacher's work, and afforded an amount of diversity and adaptability which would make its adoption practicable in nearly all colleges, and, if adopted, would give a living groundwork to educational methods, which, to be successful, must be based on the conditions of health essential to carrying on the work of instruction in schools. The teaching of the laws of health in schools would have little effect in training the scholar in the observance of these laws unless they were observed and practised in the conduct of the school, and such training could only be accomplished where the teachers had themselves been trained by practical and experimental work to understand (1) how the laws of health entered into every department of school life, the mental and moral as well as the physical; (2) that the subject was one that must be inculcated in the child by observation and experiment. In setting out the essential points to be included in a curriculum for the practical training of teachers in school hygiene, the committee confined themselves to the definition of the *minimum* of information essential for every teacher, male and female, leaving to a future occasion all consideration of the wider knowledge indispensable for specialist inspectors or instructors. Their scheme sets forth this *minimum* standard of knowledge, which, however, to be em-

ployed to advantage, demanded as a basis a previous study of general elementary science, including biology. They laid special stress upon this foundation, the possession of which had been proved by experience to place the subsequent study of hygiene in its right light. Hygiene was, by them, perceived to be a summing-up of other sciences and of their application to the demands of daily life; theories could be verified by observation and experiment, while a new dignity was added to the routine duties of existence. Of equal importance is the inclusion of the elements of human physiology in the scheme of instruction. Further, prominence should be given, wherever possible, to the study of the normal conditions of life, more especially of child-life. A permanent interest must be aroused in the means for promoting hygienic conditions among all grades of society. Theoretical study of hygiene alone rarely stimulated practical application or awakened real conviction of its truths. Not only should the teacher's course of study be planned upon practical lines, but the tests applied at its conclusion should be of a similar character. Power to observe and ability to suggest should be required, and personal acquaintance with appliances and methods, personal, domestic, and scholastic, should be demanded.

In the discussion brought about by the presentation of the report, opinions were expressed confirming in so gratifying a manner the views I have ventured to express, that I would wish to refer to

one or two of them here, in order to secure the weight of the authorities whence they emanated—for example, that careful student of the subject, Sir J. Gorst, said he had for many years thought that the physical condition of the children in our schools was the most important and urgent question connected with national education. There were two obstacles to the children's profiting by the public instruction provided in the elementary schools—exhaustion and hunger. There were no statistics by which the number of children affected could be determined, but they were not a negligible proportion. As to exhaustion, there was no doubt that for many years a great many children had been presented for instruction who, by previous labour, whether in the evening or in the early morning, and by a great deprivation of sleep, were totally unfit to receive instruction. One of His Majesty's inspectors, in evidence before the Committee on Physical Degeneration, declared that 90 per cent. of the children of one elementary school in Lambeth were rendered unfit for instruction by exhaustion and hunger. By the Act passed last year every school authority in England and Wales had now power to make by-laws regulating the employment of children of school age. But at present the by-laws of only three local authorities were in force; and a great many authorities had made no attempt to use their powers. The utmost local pressure should be employed to alter this condition of things. As to hungry

children, no local authority had power to deal with this dreadful calamity—that children were too hungry to be taught. In some large towns charitable efforts had been made to meet the evil, but they did not by any means cover the ground. If it were objected that such power granted to local authorities would weaken parental responsibility, it might be pointed out that the existing charitable effort was already doing that in a degree. No doubt a great many parents took advantage of charity, and threw upon it the obligations which they ought themselves to discharge. But a local authority, with all the powers of the police at its command, could cause inquiry to be made into the case of every parent whose child had to be fed at school; and where neglect, and not poverty, was responsible for the underfeeding at home, energetic measures could be taken. It would never be possible to carry on elementary schools properly until provision were made for putting the children into a fit state to be taught.

The views expressed by lady members were suggestive and valuable. Mrs. Marvyn (one of His Majesty's inspectors of schools) suggested that the teacher's training should include some clinical experience, because, with the present very large classes, so many things in the condition of the children escaped the untrained eye. Children classed as mentally deficient were often only suffering from defective hearing or eyesight. School managers in

the future might do much to bring teachers and parents into touch, and a great deal was to be hoped from the appointment of lady managers. There were many things which the young unmarried women who formed so large a proportion of the elementary school teachers could not understand about children—such, for instance, as the necessity of sleep for children of tender years. There ought also to be an increase in the number of women inspectors, who must be more sympathetic and approachable for the women teachers. Often what the woman teacher knew to be best for the children was overridden by the male inspector.

Another lady (Mrs. Calverly Berwicke) drew attention to the fact that much evil was caused by children sitting in school with wet shoes and stockings, and advocated that arrangements should be made for the drying of their clothes at the school door. This suggestion, covering an obvious necessity for the preservation of the health of the young, decidedly lacked practicability. Any process of desiccation requires time, and that children should sit divested of a portion of their clothing during the operation would be fraught with greater danger. It was such considerations that led me to suggest an entire change of clothing and the use of loose shoes or sandals, and I also had in mind the exceedingly unpleasant 'stuffiness' of schoolrooms; this, arising principally from the clothing, is accentuated in wet weather, and is deleterious alike

to student and teacher. If loosely-fitting clothing of suitable material were provided, and this made up by machine by the more advanced scholars, the expense would, I am persuaded, be disproportionately small, compared with the valuable hygienic advantages gained. Parents might justly be asked to pay the actual cost of material, seeing that considerable saving would ensue from diminished wear and tear of ordinary clothing.

Professor Armstrong, F.R.S., said that the hygienic teaching required was that which would encourage healthy habits in later life. The elementary schools had already done much to teach cleanliness. It was necessary to raise the intelligence of the teachers Sir John Gorst was one of the first Ministers to recognise that what was done in the school was of small importance beside the condition of the children. He had been a missionary in that matter and had rendered enormous services thereby to the cause of education. He did not believe in the physical degeneracy of the race. The root of the evil was the want of proper nutrition.

Mrs. Hoskyns-Abrahall pointed out the unsuitable arrangement of school time-tables, in which mental arithmetic followed immediately the mid-day meal Lessons were much too long. The attentive power of the child was soon exhausted. Lessons taxing the brains of young children should be followed by periods of physical activity. Whilst—bearing upon the point I have ventured to advert to at some

length—the Bishop of Hereford gave it as his opinion that '*It was one of the great needs of England that the public at large should become more interested in truly scientific education.*'

A matter of vital importance is the best and most profitable number of hours to be devoted to instruction each day. 'The business of education requires for its successful prosecution scientific observation, and the study of the subject to be operated upon—the human mind. The mind has conditions of growth which are required to be carefully noted to adapt the amount of instruction intended to be given to the power of receiving it. It is a psychological law that the capacity of attention grows with the body, and that at all stages of bodily growth the capacity is increased by the skilful teacher's cultivation. Very young children can only receive lessons of one or two minutes' length. With increasing growth and cultivation, their capacity of attention is increased to five minutes, then to ten, and at from five to seven years of age, to fifteen minutes. With growth and cultivation, by the tenth year a bright voluntary attention may be got to a lesson of twenty minutes; at about twelve years of age to twenty-five minutes; and from thence to fifteen years of age about half an hour—that is to say, of lessons requiring mental effort, as arithmetic, not carried beyond the point at which the mind is fatigued, with the average of children and with good teaching. By very skilful teachers, and with very interesting

lessons, the attention may be sustained for longer periods; but it is declared by skilled observers that prolonged attention beyond average limits is generally at the expense of succeeding lessons.

'The preponderant testimony is that with children of about the average age of ten or eleven, or a little more, the capacity of bright, voluntary attention which is the only profitable attention, is exhausted by four varied lessons upon subjects and exercises requiring mental effort of half an hour each in the forenoon, even with intervals of relief. After the mid-day meal the capacity of voluntary attention is generally reduced by one-half, and not more than two half-hour lessons requiring mental effort can be given with profit. The capacity of attention is found to be greater in cold weather than in hot, in winter than in summer. Good ventilation, lighting, and warming of the schoolroom will augment the capacity of attention of the pupils by at least one-fifth.' The foregoing quotation represents in essence prolonged, skilful, and most careful investigation upon the part of that great authority Edwin Chadwick. From this we learn that to force education is worse than useless. Hence, a great number of hours each day remain to be utilized. The question is how best to utilize them.

In the early Victorian days private schools were opened from 9 to 12 in the morning, and 2 to 4 in the afternoon. Later the hours were extended, and school times were from 9 or 9.30 to

12 or 12.30 respectively, and from 2 to 4.30 in the afternoon. Moreover, the subjects requiring brain activity were greatly increased, and the manual subjects, such as penmanship, drawing, drilling, and in girls' schools needlework, correspondingly decreased. Latterly—say, during the last ten or fifteen years—in the better-class boarding and preparatory schools there has been a reaction in favour of shorter hours. For, whilst in most cases the morning school remains as before, the afternoon school has been reduced to an hour or hour and a half, from 4 to 5 or 5.30, the time from 2 to 3.30 being devoted to games. In some schools, especially in the higher-class girls' schools, morning lessons last from 9 to 1 or 9.30 to 1.30, and there is no afternoon school whatever. In all schools except the Elementary Schools the whole-day holiday on Saturday has given place to two half-days—viz., Wednesday and Saturday afternoons. The Elementary Schools usually have from 9 to 12 and 2 to 4.30 as their lesson hours, but they do many things in school time which in private schools are relegated to outside hours in the form of home preparation.

We have not here to concern ourselves with anything beyond education in its relation to the working classes. The question, therefore, is, having taught the child for the number of hours educationalists and psychologists prescribe to be beneficial, how should the remaining hours of school life be utilized by those who are destined to earn

their livelihood manually? In this relation nothing has been of greater value than the *Half-time System* introduced by the authority I have quoted. He it was who, in 1833, was appointed one of a Central Commission to examine into the condition of the labour of children and of young persons employed in factories. The Commissioners found generally that the children were worked during the same stages as adults—eleven, twelve, or more hours daily—and they condemned this practice as being economically as wasteful as it would be on a farm to work young colts to the same extent as adult horses. They pronounced that six hours of daily labour was as long as could be allowed for young children without permanent bodily injury, and that manufacturers continuing to enforce work during those long hours must do so with double sets of children—six hours each set. The ordinary condition of long-time labour in factories had practically excluded the children from the benefits of education; so that a population had been growing up deteriorated morally as well as physically by excess of labour.

It fell to Chadwick's lot to work out a Bill providing for the organization of executive machinery for the application of the principles which were adopted by the Commission, and the provision which he proposed for the protection of the working population against exclusion from education was, that it should be a condition of the employment of

children by the manufacturer that every child so employed should produce a certificate from a competent teacher in a fitting school, certifying that the child had been under instruction three hours every working day during the week preceding. Three hours a day was half the time then generally occupied in the working schools. Hence the name 'half-school timers.'

Now, the proposition I make differs only from the half-time system in that, instead of the student working during the afternoon for an extraneous master, he or she would be occupied in some industrial pursuit well calculated to be beneficial both morally and physically, would be under the watchful eye of the teacher, and would at the same time be engaged in some industrial reproduction, which, whilst serving to impress the student with the seriousness of his life's duty, would also be profit-earning, at least to the extent necessary for providing breakfast and dinner for his school-fellows.

In connection with the length of time to be spent in school, there is another point of importance—*i.e.*, the length of time to be spent out of it, namely, in holidays. It has been pointed out that our Universities are to blame in regard to various serious shortcomings in our educational system. They are to blame in connection with the outrageous length of vacation time. It certainly is a tax upon the resources of a country when a year

consists only of about nine months. University practice, of course, influences procedure in regard to the administration of justice, and it is certainly a tax upon the country's resources when the Courts of Justice are closed for a couple of months on end. Ample time for rest and recreation should, of course, be arranged for in all departments, but I feel it must be admitted that in connection with our Universities, our Law Courts, and our schools, vacations are too long. Their efficiency *per se*, moreover, falls short of what it would be if they were shorter but more frequent. Long holidays react detrimentally upon the scholars. In America, where time is economized and utilized more carefully than with us, as a result of agitation on the part of mothers, some of the public schools have been opened during the six weeks of the vacation time for the mornings of five days in the week. The children, however, do not 'go to school' in the usual acceptance of the term. They receive, however—without books or pen and ink—a course primarily directed towards the brightening of their time, chiefly by means of nature study, drawing and music, physical culture, and manual work. The facilities so far afforded, however, fall short of the number desiring to take advantage of the innovation. The boys who are thus amused and instructed average ten years of age, the girls nine years. In connection with the vacation course, weekly excursions are organized. These vacation schools are designed to fight against the evils of the

streets, and to influence the home-life of the children more directly than is done by the public schools. Consequently, the schools are opened in congested and poor districts. There are no vacation schools in the better residential districts, where the children have easy opportunities for recreation and development. The work provided aims entirely at creating new centres or spheres of interest by any rational means which can be grafted on the very limited growth already present in the minds of the children dealt with. For example, the younger children have ordinary kindergarten work, and it is this which gives the key to the whole scheme of the course.

What is wanted in many instances to relieve the monotony of life is change of occupation, and this applies at all ages. In this connection might be mentioned some most successful experiments lately carried out by officers of the French Army in relieving the dull monotony of life in garrison towns. Various efforts had previously been made to afford the soldier some relief in dull routine, such as interesting lectures, outdoor sports, and indoor games, organized visits to museums and factories, as well as the opening of barrack reading-rooms. The idea occurred to Captain Hardy, of the 120th Infantry, that gardening would provide the soldier with both healthy recreation and profitable employment for his spare time. At Péronne, where the regiment was stationed, there was a considerable stretch of hitherto waste ground. The advice of a

neighbouring professor of agriculture was obtained, and the scheme put into operation, with the result that not only have the men been interested during the summer, but a friendly rivalry sprang up as to which company should produce the best crops. The men, moreover, have enjoyed the luxury of plenty of fresh vegetables, for the formerly unused ground has yielded no fewer than 12,000 cabbages and 30,000 leeks, besides quantities of carrots, turnips, onions, haricots, celery, radishes, and tomatoes. Rabbits and fowls have also been bred, so that the rations given by the Government have by this means been greatly augmented.

In connection with Garden Cities it should be easy to arrange similar facilities for the school children, and the friendly rivalry between groups cultivating their little patches should have an excellent result, whilst the delight of eating their own vegetables can be imagined, and many a schoolroom and hospital ward might be brightened by the result of their horticultural efforts. Bearing upon the economy of time and increase in educational efficiency, consideration of the best means of getting children to and from school should not be overlooked. This applies specially to rural districts, and is a matter that should be looked to by the powers that may be in connection with Garden Cities. Small villages stand at a disadvantage in regard to educational facilities, whilst the children also labour under certain disabilities. The matter of physical

and mental exhaustion has been touched upon, and it is obvious that a child, after a long and hurried walk or run, especially in inclement weather, is not in a fit and proper condition for mental exertion. We have many of us witnessed with pleasure in Paris and Brussels the pleasing spectacle of omnibus loads of merry and vivacious little *élèves* on their way to school. This we do not see in British towns, but in one or two of our rural districts the experiment has been successfully tried of collecting the children and taking them to school by 'pleasure-van' over distances they could not be expected to walk. This system might now be improved upon by the employment of 'motor-vans,' and by this means the area served might be very greatly extended. Instead of a number of small, and it follows inadequately equipped, schools, the rural districts around Garden Cities might be afforded educational advantages which they could not otherwise possess.

Education, as I ventured to point out at the onset, should be made a great national asset. 'Let us once make up our minds that as a community we shall see to it that all we know to be necessary for the proper physical and mental and moral development of the young shall be done, *even for the children of the poorest*,' said Lady Warwick, 'and we shall go a great way towards removing, or at least considerably lessening, pauperism in the next generation. It may be asked, "What about the parents?" The answer to this seems to me, "Do what you like with

the parents—the children *must* not suffer." For example, Sir William Anson, not so long ago, said that 60,000 children attend London schools physically unfit to receive tuition. What are we to do with these children? We know that they will join the adult "unfit," and will in a great many cases become chargeable to the community as paupers and criminals. Would it not *pay* us to feed them, and make them *physically* fit to receive the training necessary to equip them for the battle of life, and so to lessen their chances of "sinking into pauperism and crime"?'

But it must ever be borne in mind that increase of education, if *character* and just appreciation of social status be not concurrently brought into being, may also be fraught with evil. 'It is impossible for me to go into a crowded office and to see the rows of pale-faced, narrow-chested young men sitting humped upon stools, for the sake of a mere pittance,' says Sir Hiram Maxim, 'without a certain feeling of pity and disgust. They have been to a school, possibly a Board School, where they have learned to read and write, and are therefore ashamed to take up an honest trade at which they would have to work with their hands. In consequence, the ranks of the clerks are crowded by half-educated youths, whose almost unskilled labour reduces the general run of wages to starvation point.'

To be thoroughly successful, our educational system should be able to embue our working units

with a proper *esprit de corps* of their class, a becoming pride in their calling, and to put into practice the endeavour set before itself by Ruskin College—namely, to teach a man how to rise in his class, and not to rise out of it.

And here let me enter a plea for the discontinuance of apprenticeship. When we had no free education the finest school was the workshop. To-day the lad is better in school if the teaching there be made as practically valuable as possible. Apprenticeship was good in the old days, when the London apprentice at first slept under the counter of his master's shop, and afterwards married his master's daughter. To-day, especially in works and factories conspicuous by their lethargy in not being supervised by the extraneously technically trained, the effect of apprenticeship is both dwarfing and warping. It dwarfs because it constricts to the usages of the particular workshop; it warps because it leads the mind into a single and ofttimes indirect channel. Take a simple example—the apprentice of a North London cabinet-maker. He learns to make with skill and expedition a piece of furniture, or a *portion* of a piece of furniture. As time goes on, and artistic feeling makes headway, that which was once acceptable becomes ugly, and the demand for it declines. It fetches lower and lower prices, and the workman, still adhering to it, must perforce earn less, or 'knock together' more of such work per diem. He cannot turn his hand to some-

thing more suitable. He has been apprenticed to become an article-producing machine. Thus he suffers; thus art suffers. But short apprenticeships by means of 'improvers,' who may seek improvement in several works before becoming skilled artisans attached to one, is a good system. Engineers and inventors who wish to have anything new or unusual to the ordinary routine of work are good judges of the failings of the apprenticeship system.

The foregoing remarks, I submit, show that much remains to be done before our system of education attains to that degree of efficiency and practicability which would enable the maximum of national benefit to be derived from it, and I submit it is very important that every facility presented by Garden Cities—and there would be many—should be seized upon to make education more practical, and hence more industrially valuable.

MAN AND MASTER.

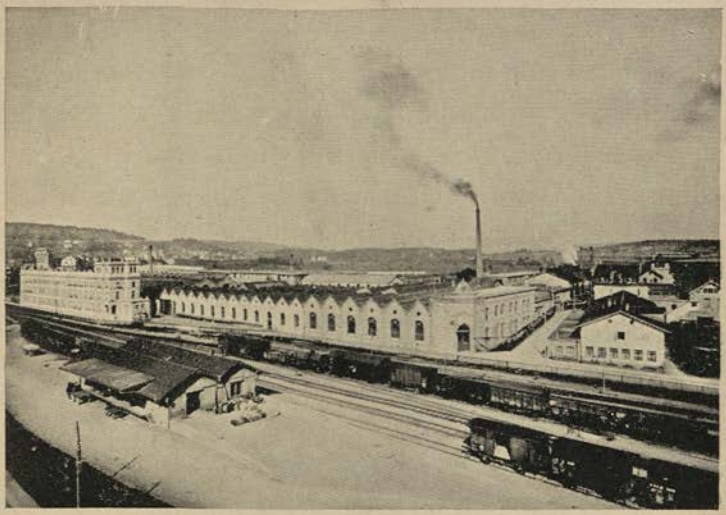
Every noble work is at first impossible.'—CARLYLE.

THE primary object of Garden Cities being the decentralization of industry, the chief factors of importance in them are the industrial units. These are popularly supposed to be the working men, but this is a somewhat narrow and erroneous view. These are, as it were, the wheels of the industrial clock, whilst the master is the mainspring. Take out the mainspring and the works will not run. The one is, in fact, absolutely dependent upon the other, for the chain of continuity must be continuous from mainspring to hands. It is, therefore, of paramount importance for maximum efficiency that no undue friction should exist in the transmission of the energy from end to end of the reproductive mechanism. It is of the greatest moment that all forces should trend in the same direction. That they do not always as perfectly as could be wished often arises from the erroneous notion to which I have referred—the idea that the mainspring takes no active part in the propulsion of the whole; that

such is, whilst profit absorbing, practically inert. Work, or energy, may be of two forms, muscular and cerebral, and each has its 'mechanical equivalent.'* The labour of the master is usually far more severe and exhausting than that of the workman; but this is a feature of the great industrial machine never comprehended by the workman. Because the two forms of energy are not always transmutable, the workman fails to detect the magnitude of the non-muscular one, until by chance he may find himself called upon to exert it.

Not only must there be a mainspring constantly exerting force to drive the works, but there must be a pendulum to control the functionment of the whole; the pendulum is supervision. In this department, again, the energy expended is cerebral, and not muscular; and here again the workman fails to take in either its extent or its importance. Practical acquaintance with the phenomenon would, however, enlighten him, as the following will serve to show. A Hull bricklayer, who on the death of a relative had come into a fortune of a few hundred pounds, decided to set up as a master builder, and as a commencement entered into a contract to erect a small villa. The building was started, but our friend soon found that an employer's life is not one of unalloyed bliss; that, as Gilbert might have said,

* The actual mechanical equivalent of muscular effort has been experimentally determined. That of the brain remains to be.



A Large Continental Factory.

Offices of a Large Continental Factory.

A Swiss Factory.

(The musical box works of Messrs. Mermod Frères at St. Croix, in the Jura Mountains.)*

* A description is given in 'Across the Great St. Bernard,' by the Author

'the master's lot is not a happy one.' An old friend chanced to pass the house one morning, and was astonished to find his mate of other days again wielding the trowel, whilst superintending him and other workmen was a strange foreman. This conversation ensued: 'Why, Jack, lad! how be this? I thought thee was a gaffer noo?' 'So I is, man—so I is. But I soon found I was no use bossin' t' men, so I detarmined to go to wark agen m'sel', an' I've hired yon chap to luk after us!'

The workman's ideas of supervision, as of the functions of a master, are, unhappily, very erroneous ones. Instead of looking upon those charged with the onerous work of supervision as essential links—nerves, as it were, connecting the brain of the works—the office—with the muscular members of the great anatomy—the men—the latter too often look upon their foremen (men risen from among themselves) as taskmasters; men to be hoodwinked and deceived in regard to the honest employment of time. Their idea of the functions of a principal, moreover, are as puerile as they are erroneous—'a man who sits on a chair before a desk all day and does nothing!'

This arises, not from inherent disrespect, but from gross ignorance of the essentials and necessities of industrial economics. Let me quote the opinion of a man of eminence, who was not only a professor of this science, but a staunch believer in the efficacy of trades-unionism—if carried out in the

proper spirit—for improving the condition of the working man: the late Professor Thorold Rogers, M.P. He said: 'The workman should seek to make his labour as efficient and fruitful as possible. The honourable desire to protect every workman in the same craft, by seeking to establish a minimum of wages, may lead to the suggestion of a minimum standard of efficiency. It is entirely essential, not only to the dignity, but to the strength of labour, that it should do what it has to do as well as it possibly can. I am sure that the workman of the fifteenth century was as proud of the integrity of his work as he was of the agencies by which he was independent. We can, even at the present day, measure and appreciate its excellence. And in order to maintain their own character, workmen are, in my opinion, justified in denouncing incompetency, sloth, or scamping work, in their own order. If it were possible for the employer to dispense with overlookers, and trust his workmen, much saving would be effected; for in order to get a larger share in the joint profits of the capitalist and workman, it is essential that the deduction from gross profits should be as little as possible. But it must, I fear, be admitted that in the modern strife between labour and capital the importance of securing that every care should be taken of the employer's interest by the workmen has been lost sight of, and, in consequence, that fund from which alone the condition of the workman can be bettered, the net profits of the whole

industry, has been needlessly and injuriously diminished. It cannot be too strongly insisted on that employer and employed have a common interest —the production of a maximum profit from their common industry; and that the only question which ought to arise in the partnership between them is that of the respective shares which each should receive in the equitable distribution of the profits. But I venture on asserting that the economy of this kind of waste is the most important of all.'

I would wish especially to draw attention to the words, '*denouncing incompetence, sloth, or scamping work, in their own order.*' Those who may have carefully studied the principles of industrial reproduction, as such men as Professor Thorold Rogers, Professor Marshall, and others whom I quote, have done, know perfectly well that, in order that a workman may earn the *maximum possible wages*, the works must be run—from the receiving wharf to the delivery crane, including the drawing office and counting-house—with the *maximum possible efficiency* and economy. Unhappily, the workman does *not* know this, because he has, in England, never been taught it. He acts upon what he *has been taught* by trades-unionist 'leaders'—men who trade upon his ignorance. They teach him that, instead of *denouncing*, he must *exercise* 'sloth,' and thus diminish the output of the factory, as by this means he will make room for a fellow-workman in it.

But he will not. He may make room for other employés, but it will be in another country. The more slowly he builds a row of cottages, the more rent will he have to pay to live in them. This is transparent; yet *he is forbidden to lay more than a certain number of bricks each day*, under the penalty of losing his employment and being jeered at as a 'blackleg!' Then, again, he fails to evince 'the honourable desire to protect every workman of the same craft, by seeking to establish a minimum of wages.' If he did, every master would be pleased to assist him in so doing; for the employer's interest and desire is obviously to secure the maximum of efficiency in his workmen. What the trades-unionist workman *is* taught to do is to take the dishonourable course of striving to enforce a minimum wage for worker and lounger alike, the inevitable result of which is to reduce his own wage, or drive his trade out of his own country; whereas were he to follow the sage advice given—namely, to himself behave honourably, and then to denounce incompetence and sloth in any other of the workers—he would so increase the efficiency in the general conduct of the works that the proprietors, *without suffering the least loss*, would be able to pay him a higher rate of wage, which, under the present system, is *quite impossible*. It should be quite obvious to the intelligent workman that integrity of work in himself, and denouncement—and hence elimination—of incompetency and idle-

ness in others in the same shop, should result in increased earnings for himself.* As a matter of fact, intelligent workmen *do see* and understand this simple point, and to their discernment is attributable the success of the smaller and non-unionist works throughout the country. But whether the unionist workman sees it or not, he is not allowed to act upon it by his, in many cases less enlightened, union leaders.

It is quite a mistake to assume, as is usually done, that the aim of the master is the reduction of wages. What he aims at is *reduction in prime cost.* Popularly, this is at once thought to imply decrease in wages. But manufacturers—especially mechanical and electrical engineers, and all those dealing with highly-wrought material—know otherwise. Amongst them is frequently heard the expression, 'Cheap labour does not pay.'

It must be apparent, even to those unacquainted with industrial problems, that the disastrous strikes which from time to time deal out such dire distress to operatives, paralyze our trade and drive it from our shores, emanate from, and are largely confined to, our larger works. This arises from three principal causes: the better appreciation by non-unionists of the above referred to principle; the absence or lower percentage of unionist men in the smaller works; the greater facility for men and master to come into touch with each other in the

* See reference in this chapter to the bonus system.

smaller factories. I trust I may have already touched sufficiently upon the first, but I would wish to say a few words upon the two remaining heads. In the larger and union works a workman is not allowed by his union to confer with, lodge complaints, or make suggestions direct to his master. He is to report any modification to the officials of the union. Now, no matter how trivial such modification may be—it is usually some improvement by introducing some new machinery* or a labour-saving device previously employed in other countries—the proprietors are at once threatened, and a strike results.

A most glaring exemplification of this has occurred within the last few weeks—an occurrence which, had it taken place in the early part of *last* century, would have been rightly attributed to the entire ignorance of the operatives, there being then no means for their enlightenment. But that such should have been witnessed in *this* the twentieth century only shows the deplorable effects of trades-

* One can take as a gauge of the degree of intelligence in workmen the light in which they view the introduction of machinery. The more unskilled labour is displaced, the higher becomes the average rate of wages, and the cheaper become the commodities which must be purchased by workmen. At the commencement of last century the militant attitude of operatives was intense. All new machinery was condemned, ofttimes destroyed, and factories burned. To-day our industrial populations cannot be too grateful for the benefits conferred upon them by machinery which clothes them with such economy.

unionist tyranny. A new cotton-mill had been got to work in Lancashire. No complaint was, or could be, made in regard to the rate of wages paid, but the new manager was thought to look after the interests of the concern a little more alertly than was the case in other mills. Thereupon a strike was called. At the moment much distress existed, and many of the operatives preferred work to the semi-starvation of 'strike pay.' They therefore continued to go to the mill, and because they wished to work honestly these 'blacklegs' were set upon and ill-treated. Large numbers of police were drafted for their protection, and the assailants being kept at bay, on following mornings and evenings they brought missiles, consisting of packages of pepper and cayenne, which they threw in order to blind their co-workers and prevent them working. Happily, the masters were not to be intimidated by the trades-unionist demonstration, and were determined not to appoint and discharge their officials at the bidding of salaried trades-unionist leaders. Therefore barricaded omnibuses were had recourse to for the conveyance of their workpeople, and railway-carriages protected with planking, otherwise their workpeople would have been disabled by stones and glass. This is an up-to-date example of the ways of British trades unionism. For this kind of thing the philanthropic (*sic*) send cheques when a strike breaks out.

It will thus be seen that riot and ruination are

resorted to by strike leaders on the slightest provocation, but the spectacle has just been witnessed of a strike being ordered *without any provocation.* There must be a reason for this. It is that the leaders, for purposes of intimidation, desire to seize upon any opportunity of ascertaining their own power and *demonstrating their potency* to others. Italy has been the scene of the last demonstration of 'socialistic' power. To increase the terror it was hoped to induce, elaborate measures for concerted action were taken, and there was a simultaneous outburst of strikes in all the principal towns. The tramway systems ceased working; attempts were made to plunge the towns in darkness by withdrawing gas-makers and electricians. Without either definite grievance or demand, everything was done to show the degree of latent power, doubtless in the hope that any and every demand, no matter how outrageous, would be acceded to. What has been the result?

The natural reaction has come in the shape of a strong feeling against the workmen on the part of those who have suffered by the cessation of work. It is said that at Milan the commercial and industrial classes have formed themselves into societies for the purpose of preventing a recurrence of this mob tyranny, and, above all, for excluding the so-called Labour party from getting the upper hand in the Municipal Councils. No fewer than 50,000 merchants and traders have held meetings demanding

the resignation of the Socialist Mayor and Corporation, and are banding themselves together to oppose the Socialists at the next municipal elections. The example is being followed at Rome, and it is recognised that, as the Socialists gained power thanks to their organization, it is only by the same means that they can be defeated. The strike was absolutely wanton, for, according to the *Tribuna*, it was only an experiment on the part of the Socialist leaders to show their power. There was no pretence of bettering the condition of the working classes, and the whole thing was simply an attempt at a revolution. But it seems to have roused the educated classes, and to have determined them to use their powers of organization to prevent such a dislocation of the life of the nation from occurring again.

This discreditable and disgraceful episode should not be merely noted by us, but similar action should be taken. The socialistic intrusion into the municipal Council Chamber is a serious menace to our future tranquillity and prosperity. The atrocities I have referred to as taking place at Ashton it is felt were largely due to the Socialistic leaning of the Mayor, and the fact that their chief magistrate could not be accepted by the masters as mediator is significant in regard to the future.

So intolerable has the state of things become that a few years ago the employers found themselves compelled to federate, in order to be able

to take joint action. This, it should be noted, they did not until many years after the workmen had federated themselves for militant purposes. The consequence of this has been that strikes have assumed vast proportions, spreading throughout the kingdom distress and misery of corresponding magnitude. And what has been the net result? That the men have been the losers! They have sustained losses which they cannot make good during the rest of their lives. *During last year alone the time lost by the men was equivalent to three thousand years.*

The report on 'Strikes and Lock-outs in the United Kingdom,' made by the Board of Trade, forms instructive reading. Needless to say, it is a perfectly dispassionate statement; and the facts that, out of seventy-two of the principal labour disputes of the year, the result was in thirty-four completely in favour of the employers and against the men, while in many of the others the strikers only received partial satisfaction of their demands, are therefore the worthier of consideration and reflection. One table shows that in disputes on questions of remuneration, the balance of results during the year was greatly in favour of the employers. Of 49,557 workpeople engaged in such disputes, only about 8 per cent. were entirely successful, while 71 per cent. were entirely unsuccessful, and compromises were arranged by 20 per cent. The aggregate number of working

days available in each year for the whole industrial population of the United Kingdom may be roughly estimated at about 2,900,000,000, and of this the report under notice shows that the aggregate of time wasted over disputes in 1903 was 2,338,668 days. Now, 2,338,668 working days are equal to rather more than 6,000 working years; and, even granted that in 50 per cent. of the disputes the strikers won a complete victory (obviously a highly-exaggerated supposition), there would still remain a period of working time equivalent to 3,000 years wasted during the twelve months.

In considering this serious question of the immense national loss caused by strikes, it will be instructive to glance at the cognate effect of dilatoriness. Taking the 2,900,000,000 working days to be of eight hours, we have 23,200,000,000 hours per annum. Now, if we assume that one-third of the operatives did full work whilst two-thirds did but half as much as might be done in the hour, then we have 7,733,333,333 hours wasted during the year, or, taking three hundred days to the year, 25,777,777 hours wasted each day. What does this mean to masters, to workmen—for they would participate in the saving—and to the nation? If the average wages be taken at sixpence an hour (the artisans earn nearly double that), this means that the loss due to such waste of time amounts to the enormous figure of *nearly two hundred millions* every year—that is, *nearly six hundred and fifty thousand pounds*

every day (£644,444). More than *eighty thousand pounds every hour* (£80,555). It means *a preventable waste far exceeding a thousand pounds every minute* (£1,342).

This want of integrity in our artisans—it is no use blinking the fact—is the principal cause of our suffering so heavily from foreign reproductive competition; this is the reason they have been able to turn the table and supply us instead of our supplying them, and at rates much cheaper than our men manufacture things. But, unhappily, when opportunity arises for an ample amount of work, the attitude of the men is such as to drive it abroad. Nothing could better illustrate this than an example occurring while I write, and resulting in the loss to us of a contract of over a quarter of a million pounds. The Austrian Government recently gave to Messrs. Yarrow a contract for thirty destroyers and torpedo-boats. In order to carry out the order night-work was necessary, and the firm made the usual offer of pay at a 'time and a quarter.' The workmen held out for 'time and a half,' a rate which would have left no profit, and possibly a loss, on the job. The workmen's attempt to put on pressure, when they thought that the firm would be driven by the force of special circumstances to give way, has proved as suicidal as it was unpatriotic. Messrs. Yarrow have been forced to the determination to carry out the contract in Austria. Foreigners will pocket the wages which should belong to London

men, and the Thames, not many years ago without rival as a shipbuilding centre in the world, will have fallen further back from its pride of place. The incident, unhappily, is not new or unusual. The shutting up of some of the great Thames works years ago was forced on the owners by the high-handed action of the workmen, who thought that a sudden rush of prosperity made them masters of the situation.

Thus the men are often the authors of their own poverty. How many works on the Thames are silent, and how many have disappeared, for no other reason than the determination of the trades unions to promote the workmen's interests by the popular method of driving away employment!

From this it will be seen that what is wanted, not only in regard to our workmen, but—and this still more urgently—in regard to their leaders, is education—not 'book-learning,' but enlightenment directed towards the strengthening of integrity of purpose and, it must follow, of national character. Free education, it may be urged, is a very expensive thing; but it must be looked at from a comprehensive point of view. A multitude of educated, and therefore more enlightened, industrial units is obviously a more or less valuable national asset, according to whether or not that education has been able to produce *character*, and to invest those units with a proper sense of duty, not only as between each other, but towards their nation. The national

worth of character is, I feel, not adequately appreciated. 'That which raises a country, that which strengthens a country, and that which dignifies a country; that which spreads her power, creates her moral influence, and makes her respected and submitted to; bends the heart of millions, and bows down the pride of nations to her—the instrument of obedience, the fountain of supremacy, the true throne, crown, and sceptre of a nation—this aristocracy is not an aristocracy of blood, not an aristocracy of fashion, not an aristocracy of talent only: it is an aristocracy of *character*. That is the true heraldry of man.'*

I feel most strongly that the influence of new towns of limited population, replete with all that tends to elevate, and with such facilities as would whet the zest of emulation, may fairly be expected to do a grand work in the direction of building up this national asset. *Pouvoir sans savoir est fort dangereux!* but, then, on the other hand, knowledge ill-directed is also very dangerous. If, for example, such knowledge is to be used for the reinforcement of the present pernicious tenets of trades-unionism, the outlook is not hopeful. There are, however, not wanting evidences that enlightenment is inculcating a broader view, and demonstrating to the units that strife for higher wages and restricted output, by reason of the altered aspect of international competition, leads only to the *extinction of industries*. Hence there

* *Vide* the *Times*.

is hope that the great latent forces may become better directed and utilized for mutual betterment, rather than in militant activity as between labour and capital. In this case the words of Fuller, that 'learning is the greatest alms that can be given,' will become nationally fulfilled.

In this relation one cannot but view the establishment, in one of our ancient University towns, of a college established for the specific purpose of instructing working men, who, it is hoped and intended, will at a later date take their places as leaders of their fellow-men, in any other light than that of keen interest. Ruskin College, Oxford, has been established, it is stated, with the main object of enabling the leaders of working-class opinion, such as officials of trades-unions and co-operative societies, and those who may possibly find their way to the House of Commons, to go to Oxford for one or two years to study scientifically the problems which they have to solve. The foundation of the college was led up to by the growing inclination of the working class to use political machinery for the attainment of their aims. Such a direction is surely to be welcomed in preference to the present one, the underlying principle of which is exclusively individual gain and betterment of the industrial units at the cost of employers and at the loss of national prosperity, involving in its carrying out much internecine strife and dislocation—ofttimes temporary paralysis—of trade. If such political

power is to vest in men—well-meaning and enthusiastic, it may be—who are capable of but a limited outlook upon the problems of the times, the result can have but evil and nationally disastrous effects. We are told, however, that, in regard to this college for their especial training, 'the endeavour' is to create in each student a feeling of responsibility. He is taught to regard the education he receives, *not* as a means of personal advancement, but as a trust which he holds for the good of others. He learns in order that he may *raise*, and not *rise out* of, the class to which he belongs.'

One obvious danger of such an institution is that the teaching might be either too academic, on the one hand, or too partisan, on the other. This, the originators state, they are fully alive to, and that 'very careful steps have been taken to guard against this, both in the charter of incorporation and in the constitution of the Council.' To keep the working of such an institution—admirable in principle—free from political bias, except such as the student may—and is entitled to—himself draw inferentially from the economic principles enunciated, I feel will be a very difficult matter, the more difficult the fewer the number of professors attached. The public would, therefore, peruse with much interest, mingled with solicitude, the *genre* of instruction—the text-book as it were—of this college of social economics.

At present the politics of trades-unionism are grossly inconsistent. They cry out for Free Trade,

free institutions, free everything, but especially for freedom of action for their own membership; yet they deny freedom to labour; they boycott, waylay, molest, and maim honest working-men as they pass to and from their labour; they intimidate and coerce them into taking their views for peace' sake and self-preservation. That is the trades-unionist attitude towards freedom; thus they prove themselves the most craven Protectionists.

Freedom in regard to labour, freedom to compete in honest work, and fair play to those endeavouring conscientiously to make headway, are foreign to the tenets of British trades-unionism. But the superlative degree of inconsistency is reached when the Radical reformer—the friend of the working man—thus shown to be the most craven of Protectionists, denies and opposes any protection to all honest workers of lower grade than artisans. The struggling unskilled worker, with his wife and children to support, is to have his social *status* reduced, robbed alike of his earnings and happiness by open-armed welcome extended to the dregs of foreign nations, who, arriving here in their hordes, in many cases drive him from his dwellings, and subsequently become his master. Thus is crushed out of the worker both *freedom and hope*, the two moral factors that above all increase, not only man's willingness, but also his power to work. Physiologists have taught us that, for a given amount of exertion, loss of the store of nervous energy is consumed if work

be carried out under the stimulus of pleasure than of pain; and *without hope there can be no enterprise.*

I have elsewhere referred to the changes in things agricultural which forcibly necessitate our learning to *think imperially.* Now, the vast strides which have been made during the last two decades in inter-communication have rendered it almost inutile to argue out the principles and practice of national economics; it has now become imperative to discuss *international economics.* It is mere waste of cerebral effort to work out recondite principles and elaborate means of carrying them into effect as applicable to a single nation—as if that were isolated from the general reproductiveness of the world—when the fact that other nations neither acknowledge such principles nor act upon them utterly vitiates their international validity.

Let us, then, in all sincerity, hope that the new departure—this college bearing the name of one, if unpractical as to his politics, of memory revered for his high standard of integrity, his love of freedom, his intense appreciation of *character*—let us, I say, fervently trust that it may inculcate views not inimical, but hugely helpful, to our national industries.

Nothing could be more pernicious nationally and more fatal individually to our workmen than the doctrine of equality—both in manual skill and financial status—inculcated by trades-unionism in order to enable it the better to fight employers.

The very reverse ought to obtain. The workman should be made to appreciate the fact that he may be, if he choose, throughout his life in a state of transition from one status to another, just as his master, who not long previously may have been on exactly the same level with himself, is in the transitional stage between independence and affluence. Bearing upon this Professor Marshall says: 'There is, then, on the whole, a broad movement from below upwards. Perhaps not so many as formerly rise at once from the position of working men to that of employers; but there are more who get on sufficiently far to give their sons a good chance of attaining to the highest posts. The complete rise is not so very often accomplished in one generation; it is more often spread over two; but the total volume of the movement upwards is probably greater than it has ever been. And it may be remarked in passing that *it is better for society as a whole that the rise should be distributed over two generations.* The workmen who, at the beginning of this century, rose in such large numbers to become employers were seldom fit for posts of command. They were too often harsh and tyrannical; they lost their self-control, and were neither truly noble nor truly happy; while their children were often haughty, extravagant, and self-indulgent, squandering their wealth on low and vulgar amusements, having the worst faults of the older aristocracy without their virtues. The foreman

or superintendent who has still to obey as well as command, but who is rising and sees his children likely to rise further, is in some ways more to be envied than the small master. His success is less conspicuous, but his work is often higher and more important for the world, while his character is more gentle and refined and not less strong. His children are well trained; and if they get wealth, they are likely to make a fairly good use of it.

'When a man of great ability is once at the head of an independent business, whatever be the route by which he has got there, he will, with moderate good fortune, soon be able to show such evidence of his power of turning capital to good account as to enable him to borrow in one way or another almost any amount that he may need; and, on the other hand, a man with small ability in command of a large capital speedily loses it. He may perhaps be one who could and would have managed a small business with credit, and left it stronger than he had found it; but if he has not the genius of dealing with problems, the larger it is the more speedily will he break it up. These two sets of forces, the one increasing the capital at the command of able men, the other destroying the capital that is in the hands of weaker men, bring about the result that there is a far more close correspondence between the ability of business men and the size of the businesses which they own than at first sight would appear probable. And when we consider all the many routes by which a man of

great natural business ability can work his way up high in some private firm or public company, we may conclude that wherever there is work on a large scale to be done in such a country as England, the ability and the capital required for it are pretty sure to be speedily forthcoming.'

The mere perusal of the condition of things industrial obtaining, thus properly set out, shows at once that the doctrine of equality is tantamount to cessation of national progress—which, indeed, it has already gone far to bring about. In considering my subject I am, of course, assuming in regard to Garden Cities that their constitution shall be in accord with national law—the only one prepollent for success—in which the units would extend throughout the whole gamut of social orders, from the erstwhile slum dweller, through the moderately-paid unskilled worker, the highly-paid skilful artisan, the managers and clerically employed, and the employer of such labour, up to those of independent means. And in this connection I would wish to touch upon the great error, so frequently noticeable, of dividing the inhabitants of countries or towns into but two, and absolutely distinct, classes —rich and poor. This practice is quite wrong, and the notion underlying it entirely erroneous. It is true that a considerable space separates the one from the other as representing the two extremities of social status; but this space intervening is entirely filled with a continuous series of units, each dependent the one upon the other, each in more

or less active condition, and each, as part of its appointed function, bearing its share in the transference of influence from one extremity to the other. We may picture such a series of units by means of a long row of indiarubber balls, each

capable of expansion or contraction and of lateral movement, so that each is free to influence its neighbour and to propagate that influence from end to end of the industrial series.

Considerable interest would attach, were values given to the individual units, to a study of the change in the appearance of that row of expansible balls which time has caused to take place and future years may cause to take place. According to popular reasoning, the extremities would be formed of balls representative, at the one end, of the wealthy and independent, and at the other end of drones and outcasts, because each of these classes is considered to be of the least, or zero, value in the chain of industrial units. But then it is obvious, and in accordance with the tenets of political economics, that these balls could not be of equal size. Seeing that the industrially reproductive units are of the greater importance, we should therefore be led to picture the sequence thus.

But we know that within the last quarter of a century the balls at the one extremity—the wealthy and useless units—have entered into trade, consequently the little ciphers representing them should be replaced by larger ones ; they should then be exalted from their extremity of uselessness to the centre of the line of activity. But during the period some of the central or active units will have attained to affluence; consequently they must be shifted to one extremity, for they will have become reproductively inert. And so one could go on picturing the expansion, contraction, and transition of these spheres of national influence. Even in domiciliary position the atoms and molecules have changed places in a most surprising and interesting manner. The useless atoms at one end of the sequence — the idle, the dissolute, the morally opaque and the criminal unproductive—now occupy the land erstwhile the domain of those at the other end, the reproductively idle—the rich. The broad acres of the wealthy have indeed become invaded by the poor. Where noble mansions reared themselves 'mid old-time gardens, surrounded by pigmy hamlets of happy and contented dependents, now is a densely-packed ocean of workaday streets, of alleys and slums of misery — peopled by the dependents of charity.

In some such manner should we look upon the human units of a nation ; and what applies to a nation applies equally to every town and village in

it. It is as illogical as it is stupid in your socialist to picture human life as made up of a number of components of equal worth and strength. Just as in the animal kingdom the value of units for self-preservation ranges further than from the elephant to the flea, so in human communities we have our giants and our pigmy extremities, according to the mental vigour and activity possessed by them. So again in ability to command; human life is controlled by human factors spread over a wide range of individual ability and importance. It is just as irrational and short-sighted to think that the gentleman and the gentlewoman are mere excrescences, and useless entities in the utilitarian and political economy of a nation, as to ignore the fact that a hive is controlled by a Queen Bee, and to deem *her* functions superfluous and non-utilitarian. The socialist is, of course, entitled to point to the fact that if our output be equivalent to, say, £1,500,000,000, and this is produced by one-half the population, it could be doubled if a greater proportion were workers.* But he ignores the law of supply and demand. We can to-day make more of many things than we can dispose of, but that is principally due to defect of our fiscal arrangements, whereby we are prevented from getting on an equality with our competitors.

* According to the census returns of 1891, out of a total population in the United Kingdom of 37,733,922, not less than 20,917,219 were without occupation.

Co-operation, as I have endeavoured to show in these pages, is a good thing. But the loud-voiced advocates for it never seem to have thought what a splendid field, already in partial working order, there exists for the exercise of it between master and man. On the contrary, the trades-unionist feels that the master and capitalist has but one function—to pay out wages—that he should participate in the profits, to their minds, is a totally negligible detail. A short time ago a prominent member of an important trades-union, who is also a Member of Parliament, stated that in his opinion *profit-sharing is a mistake!* 'My view,' said he, 'is that the employer should pay trade-union wages, and work his men trade-union hours, and if he can make anything out of it he ought to stick to it.' The view is doubtless founded upon a pretty confident opinion that under the system he advocates little or nothing remains for the employer.

Of all methods of wasting time, the frittering away of it in quarrelling is the most deplorable. But deplorable though the waste of time, this represents but a fraction of the actual national loss, for dissension between man and master has been a most potent factor in driving out our trade to other countries. It behoves us, then, to consider what means of mitigation are open to us, and to adhere to our more immediate subject, to ask ourselves if Garden Cities can be instrumental in such mitigation. If properly organized and conducted, there is

no doubt that their power for good would be very great, always assuming that common-sense and respect for the exigences of trade and industrial economics be observed. Before the site for the first, so to speak experimental, Garden City had been chosen, and whilst the important point was under discussion, I inquired of a red-hot Radical advocate what was the rate of wages in a particular district proposed. His sharp reply was, 'That doesn't matter—that doesn't matter; we mean to make them as high as we can!' Now, if that be the idea and intention—to brow-beat employers into the payment of a rate of wages in excess of the average—it requires no prophet to correctly forecast disaster. There should be no interference between man and master. People who subscribe towards relief funds for strikers are guilty of a grossly unjust and immoral proceeding. What right have they to join in a fray—on either side—with things which not only do not concern them, but which they do not understand in the least? Some of the largest strikes have arisen from the most trivial things, as, for example, the discharge of a single individual. The employer—who has to pay the wages—has a perfect right to dispense with the services of any of his men. That is a purely individual matter. On the other hand, the workman has a perfect right to leave his employer and to take work elsewhere. But he has *no right* to throw himself out of employment and his wife and children upon the poor rates of his country

when he has good wages open to him during the time he fails to obtain better.

Certainly, no good would come from meddling as between master and man; it is precisely this which causes the bulk of the trouble. Nor is the Garden City advocate's view, that everything depends upon the actual amount paid each week in wages, a very enlightened one. 'In our nineteenth-century cry for higher wages, we are apt to lose sight of the fact that many things are more important to the working man than a few shillings added to his weekly income. A good supply of water, well-paved and lighted streets, a market in which he can always obtain wholesome food, and properly guarded sanitary conditions, will do more to raise his standard of living above that of his ancestors than any increase in mere money income. With these he can lead a healthy, orderly life on comparatively small wages; without them no rise in wages, however desirable in itself, will enable him to escape danger and disease.'

Thus writes Mrs. Bosanquet, and then proceeds to give examples where men earning but the unskilled rate of wages—*i.e.*, far less than the artisans to whom I now refer—have lived respectably, brought up families, and maintained very comfortable homes. I need not dilate upon the social advantages which would accrue to the industrial dwellers in Garden Cities, nor to the good uses they could be put to by the conscientious workers. I wish here to confine myself to the industrial effect

and value of proper relations subsisting as between man and master.

Money *per se* has no real intrinsic value; its value, as in the case of ordinary merchandise, resides entirely in what it will bring—what it will buy. Thus, in a town in which everything costs twice that of another town, a workman receiving twice the wages would be no better off. Conversely, in a town so advantageously placed that everything could be obtained at half the cost, the workman would be just as well off with half the wages.

But now let us see the effect of the latter condition upon the works in which he may be engaged, and upon the prosperity of the town in which the works may be situated. From the social point of view lower wages combined with certain advantages amount to the same thing as a higher rate of wages without such advantages. But this does not hold good nationally and internationally. Much of the enormous sums paid out by us for imported merchandise goes in payment for goods we could, and in many instances originally did, manufacture for ourselves. The effect of this is that during the manufacture of such the wages are paid out to foreign workmen instead of our own. Now, the factors which principally determine whether or not we can manufacture such goods are principally the rate of wages paid and the number of hours worked per week. Neglecting the latter, it is clear that in the case where the workman is enabled to maintain

precisely the same standard of life with a lesser wage, business could be carried on, whilst in the case where he received higher wages and yet was no better off, it is equally clear the works must be closed and the man thrown out of employment.

Now precisely the same applies nationally. The topographical position of a town will frequently determine whether or not it can successfully carry on certain trades. But what is more important are the facilities offered by a town for the carrying on of a manufacture within it. Principal among the factors of production cost are rent, rates, and taxes, freightage and the cost of motive power, lighting and heating. Now, had the industrial revolutionist to whom I refer supplemented the laudable desire to increase the rate of wages to be paid by a well-thought-out scheme of how such increase could be made payable, he might have been justified in his hopes. But this is precisely what has *not* been done. It was also precisely this that I had in view in bringing the matter of Garden Cities before the British Association of Science, and drawing attention to the potentialities of applied science in relation to them.* Had the opportunity been seized—by means of the latest developments of applied science—to facilitate industrial reproduction by effecting economy in regard to the factors of prime cost to which I have referred, then there would have been every prospect of realizing the hope. But the

* A portion of the original paper will be found in Chap. IX.

neglect to devise and provide for the compassing of this end when the unique opportunity presented itself will go far to delegating the desideratum to the visions of the reformer's dream.

Assuming that Garden Cities have little or nothing to offer to manufacturers in the way of economy of production, then their prepollency lies chiefly in the unique opportunities they should afford (*a*) towards the instruction of the workers in the science of industrial economics, and (*b*) in bringing about the so much to be desired intimacy between master and man. First, let us assume that the men, instead of subscribing to a union which fritters away their subscriptions in strife throughout the length and breadth of the land, paid in their money to a fund for their mutual benefit and enforcement of their just grievances, the benefits of which would accrue to themselves directly. Now, by their very constitution, the limitation of their populations, and their more perfect and communalistically available social advantages, the facilities for friendly intercourse between man and master would be provided. In huge and overgrown towns the workmen, on leaving their employment each night, take tram or train and disappear entirely, not only from the eye of the master, but from touch as between themselves. Men working in the same large works are as complete strangers to each other as the denizens of the miles-long streets of the overgrown industrial hives. Consequently, each

year sees no improvement in the necessary intimacy of relationship; they become acquainted with their own work *quâ* machines, but not in the essentials of the vast national machine of production and commerce. They neither know nor are able to appreciate the exigencies and principles necessary to be complied with. Hence their whole interests become confined to the weekly pay-desk. Happily, a sufficient number of *quasi* Garden Cities or Villages now exist to show that this undesirable state of things, so eminently militant of harmonious working, can be rapidly changed. Some of such towns have been dealt with in the preceding volume, and we have the assurance that the class of men brought up therein and their *status* is altogether superior to the average; whilst one has only to visit such a happy community as the dwellers in Port Sunlight to observe that their *status*, their *amour propre*, is a thing apart in the country—a most gratifying contrast to anything to be found in the workers' slums of our great and overgrown hives of industry. With such evidence behind us, and prospects of extension before us, we are, I feel, amply justified in looking forward to the desirable transition *a posse ad esse*.

'Disputes of some kind between capital and labour are always in evidence, but it must never be forgotten that in the wide fields of domestic service and in that of the few employés with a working master, which combined embrace by far the greater

number of wage-earners, all is, upon the whole, satisfactory; there reigns peace, with the inevitable individual exceptions. We see in this encouraging fact the potent and salutary influence of the personal element. The employer knows his men, and the men know their employer; there is mutual respect, sympathy, kindly interest, and good feeling, hence peace. In the extensive field of domestic service we best see how true it is. "Like master, like man; like mistress, like Nan." Here we have the relation of the employer and employed in its closest form, and innumerable households testify to the harmonizing effect of personal relations. The trusty servant becomes practically a member of the family, deeply attached to it, and the family reciprocates the feeling. Few householders are without old retainers and pensioners, and to the end of their days, and even to that of the children of the household, the relation remains unbroken. The friendship of the employers and their children for the old servants, and the affection of these for their masters and mistresses and their children, is one of the most delightful features of life.

'What has produced this reciprocal affection? Not the mere payment of stipulated wages on the one part, and the bare performance of stipulated duties on the other—far from this. It is something more done on both sides, and the knowledge each has had opportunity to gather of the other, their virtues, kindness—in short, their characters. The

strict terms of the contract are drowned in the deep well of mutual regard. Labour is never fully paid by money alone.

'If the managing owners and officials of great corporations could only be known to their men, and, equally important, their men known to their employers, and the hearts of each exposed to the other, as well as their difficulties, we should have in that troublesome field such harmony as delights us in the domestic. It is mainly the ignorance of contending parties of each other's virtues that breeds quarrels everywhere throughout the world, between individuals, between corporations and their men—and between nations. "We only hate those we do not know" is a sound maxim which we do well ever to bear in mind.' In these words were expressed the views upon this important point of the head of the largest corporation the world has yet seen.*

In reading the analogy thus drawn between works management and domestic management, I think, perhaps, a point will occur to the reader which is ever present in my mind—namely, the absurdity of the system at present adopted in engaging men, which is done utterly regardless of *character*. Imagine the result upon the household that would inevitably accrue from the indiscriminate engagement of domestic servants. Were we to take ser-

* Andrew Carnegie, in addressing the members of the Iron and Steel Institute of Great Britain, 1903.

vants without a 'character,' we should be robbed of our goods. By engaging men without a 'character' we are robbed of our money, for that, in this relation, is precisely synonymous with time. Setting aside the vast amount of pilfering of goods and stores which goes on,* robbery by means of wasted time is so serious, that it is well known if every worker, in an engineering works, for example, were to faithfully work out all the hours he is paid for, a rise of perhaps 50 per cent. might be made in the wages paid without entailing any loss upon the proprietors. I have little doubt that were an attempt made to enforce this common-sense practice—this 'character' system I advocate, which would be so highly beneficial to the honest workers—a strike would ensue. Nevertheless, it is one which the conscientious worker would value, for it is obvious that if a standard 'character form' were made use of, and this were presented by a workman about to leave to the head of his department to have it attested with a true statement of character and the reason for leaving, such a document would be of the greatest value to men seeking employment. Any break in the continuity of dates which could not be accounted for and attested would, of course, bear a proper interpretation. Such a certificate of

* I was recently informed by the director of a sewing-machine company that so wholesale and continuous was such pilfering that it was known the stolen parts were subsequently put together to form complete sewing-machines and sold.

character should be subject to endorsement upon it —just as obtains in regard to cabmen's and omnibus driver's certificates of license, or, indeed, that of a gentleman driving his motor-carriage—of any conviction which might have to be debited against the character. Such a system, I repeat, though it would be strenuously opposed by the shirker, would be cordially welcomed by the conscientious workers, and it is needless to point out that on the latter presenting 'clean bills' they would be inducted into the posts of honour—namely, those of men entrusted with responsibility and in whom it is necessary to place implicit confidence. If 'characters' be necessary and called for in the office, why not in the works?

I venture to suggest that to gloss over the undoubted fact that British prosperity has wrought a deplorable change in the nature of the British working man (coupled with the deleterious effect of the mistaken tenets of trades unionism) is a cowardly thing to do—both from the national point of view and in the interests of a large section of honest and well-meaning working men. The conscientious worker and the aspiring student would each welcome well-intended criticism. Those who really desire to get on in life by intrinsic merit *ask* to be told of their faults. It is, therefore, matter of great surprise that recent plain speaking on the part of an eloquent preacher* should have been received

* The Rev. R. J. Campbell, M.A., of the City Temple, London.

with such vehement protest as has been the case. And one can only conclude that the outcry has come from those whom the cap may have fitted. For just as scholars with genuine *esprit de corps* implanted in their breasts would desire their college to be rid of the idler and laggard who brings discredit upon their college, so should the true working men of our country welcome *any* comment or movement which would enable them to dissociate themselves from those who bear the name of their class, but whose utter want of integrity and moral rectitude results in a stigma being cast upon themselves. To my mind, the passage which has been so bitterly resented was written in sincere and patriotic regret, and I will, therefore, reproduce it here :

'Saddest of all, perhaps, to the lover of his country is the present mood of a considerable part of our working-class population. Two-thirds of the national drink bill is incurred by the working man. His keenest struggles are for shorter hours and better wages, but not that he may employ them for higher ends. He is often lazy, unthrifty, improvident, sometimes immoral, foul-mouthed, and untruthful. Unlike the American worker, he has comparatively little aspiration or ambition. Conscientiousness is a virtue conspicuous by its rarity. Those who have had close dealings with the British working man know he needs watching, or work will be badly done, and the time employed upon it

will be as long as he can get paid for. It is, as Ruskin puts it, that joy in labour has ceased under the sun.'

This is the picture drawn, and from wherever the preacher may have culled his colouring material, it is a faithful picture. Large employers of labour will at once recognise it as being absolutely true in detail—within the limits defined by the writer, 'a considerable part of our working-class population.' Employers, moreover, will note with approval the correctness of the limitation, for whilst appreciating that that holds good in regard to those who may, from time to time, have worked in their works, they know that there is also a proportion to whom the converse would apply.

It has for long been matter for surprise on the part of those practically acquainted with this nationally important subject that the section of right-minded working men of this country, more especially the still considerable body of non-unionists, should remain quiescent and allow themselves to be classed with those who bring discredit upon them. The answer is doubtless to be found in the fact that to alter this state of things combined action is absolutely necessary, and they, *ex necessitate rei*, have not hitherto possessed the requisite machinery for combined action. I am persuaded, however, that the honest and well-meaning working men of our country will not allow matters much longer to remain in the present

unsatisfactory condition, and I feel that the first stone in the rampart of their defence has just been laid by the formation in Manchester of a working men's association for mutual betterment and increase of strength by unity, with the specific object of disassociating themselves from the radically militant and fatalistic modes characterizing most of the present labour organizations.

'For many years,' says a great engineering authority—Sir Hiram Maxim, who recommends that we should 'suspend conventional lies and look the facts squarely in the face'—'the English working classes have been deteriorating. This has been brought about by public and private charities, and by the workings of the Poor Law.

'Man is an animal governed by the same laws that govern all other animals. Nature has but one means for improving and strengthening the race, and that is the automatic cutting off of the unfit. This is Nature's pruning-knife, which under natural conditions is constantly at work. Without this pruning-knife, not only is improvement impossible, but actual deterioration is inevitable, and this in time debases the whole race. The artificial suspension of the action of this pruning-knife has so modified a part of the English race that it has been found quite impossible to obtain British sailors to man British ships, or farm labourers to work the land. Although hundreds of thousands are unemployed, they seem to prefer a life of idleness to

one of steady work. This state of affairs has been brought about because England has for a long time been a very rich nation.'

Now we have to ask ourselves, How is the well-meaning working man to disassociate himself from these *undesired*, and to present himself to the employer as one of those *desired* and sought after? To my mind, there are no means which could so readily be brought into efficient play as the simple and rational mode I advocate of the *invariable engagement of men with a record of character*. The character of a man might be well known and respected in a Garden City, with its limitation of population, especially if his calling were of a permanent nature; but in large towns, and with the ordinary exigencies of the labour market necessitating migration, little may be known of the most honourable and praiseworthy worker. The 'character record' system would solve all such difficulties. I would go farther, and urge the further formation of associations of working men, such as that I have adverted to. I would go still farther, and counsel that such associations should lay down *a standard* in regard to these 'character records' which should determine the eligibility of membership, and if in connection with such associations a 'certificated'—or 'character record'—bureau were established, there would, I am convinced, in times of normal prosperity, never remain upon the register an unemployed member for a single day.

It might at first be thought that the formation of a working man's association such as I suggest would take time, because of the necessity of carrying the record of character back for a reasonable and effective period. I feel, however, that this disability would not arise; for masters would be only too pleased to attest the 'records' in all cases where they were applied to by men who were working, or had worked, in their factories or upon their works. I would suggest such a title as 'THE CERTIFICATED WORKING MEN'S BUREAU,' and would class as eligible, not only all men who could show a good five years' record, but all past students of Technical Colleges who held certificates of, or above, a certain standard. It would be well for such association if it could secure as President an influential employer of labour, or a man of eminence versed in industrial problems, as well as honorary members who would act as a 'council of advice' with whom the working men 'executive committee' could confer.* 'Character Record Forms' would be issued by the Bureau to employers of labour to be handed to their work-people on application. These should be printed upon stout vellum paper, the better to withstand the wear and tear of time, and enclosed in an envelope cover of cloth, or some such suitable material; they should be printed with a margin in suchwise that

* If among my readers there be any—either masters or men—who see eye to eye with me in this important matter, and are prepared to actively co-operate in connection with it, I should be pleased to hear from them through the publishers.—A. R. S.

The Sports House.

'At Play'—the Master 'Kicks off.

they could be fixed into the cover by ordinary fasteners, a separate 'card' being used for every situation held. I annex (on pages 812 and 813) a sample 'card' by way of suggestion.

The agencies that may be brought to bear in such communities as those with which I am here dealing will be many and varied. Some, *primâ facie* feeble, will be found to be strong. Take the case of the ties of intimacy and friendship which may be made to result from 'sport.' The master who, in addition to subscribing to the prize fund, is seen upon the 'ground,' who 'kicks off' as an adept in the friendly tussles between his and neighbouring factories, who takes his place at the wicket and wins the admiration of the 'field,' will, at the same time, immediately win the respect of his men; he will no longer be 'the boss that sits at his desk and does nothing,' but a —— good sort. When that master, in the pleasant winter evenings spent not in the 'pub,' but in the recreation-room at a 'sing-song,' wherewith the pipe and glass of foaming 'lager' will lead to conviviality combined with elevating social intercourse and not to drunkenness, is found socially among the workers; when he, in the chair at social-improvement *reunions*, enters upon frank and careful explanations of business relations and business necessities, of desirable changes for mutual benefit—changes in the joint interest of master and man—such explanation will fall upon alert ears; and active—instead of drink-

CHARACTER RECORD.

From Jan. 1, 1897, to Aug. 10, 1904.

Name Allan Mackenzie.

Age 28. {Single. / Married, Aug. 12, 1904.

Occupation Fitter and Turner.

PARTICULARS OF ENGAGEMENT.

Jan. 1, 1897.	Came as an improver from the Municipal Technical College, holding certificates for courses in mechanical and electrical engineering. Honours in mathematics and drawing.
Jan. 1, 1899.	Was entrusted with the setting out of our standard high-speed engines.
Jan. 1, 1900.	Went into testing department.
Jan. 1, 1904.	Was made foreman of our testing department.
Aug. 10, 1904.	Left us to go to U.S.A. to acquire knowledge of American practice.

CHARACTER.

Always sober, industrious, and attentive to his work.

ADDENDA.

He gave entire satisfaction, and our best wishes go with him.

Signature of Workman Allan Mackenzie.

Signature of Employer

John H. Field (Director),

For J. H. FIELD AND SONS, LTD.,

Vulcan Works, Manchester.

Date Nov. 1, 1903.

These cards are issued by THE CERTIFICATED WORKING MEN'S BUREAU, and it is earnestly requested that employers will carefully fill them up with the true facts concerning those who may apply for a record, and give one to each of their employés when leaving.

sodden—minds once bent in the direction of self-respecting emulation, the ramparts of isolation will have been effectively stormed, and victory over industrial obstacles easily gained by the combination of forces of man and master.

Experiences gained in connection with large works in country places have shown the great value in happiness to the men of the masters being able to keep in touch with them. Not one workman in a thousand, after he leaves his employment in the evening, gives one thought to his work. 'Having no refined tastes to gratify,' he finds his most cherished amusement in sensual excess, excessive drinking, and such-like. Not so the master. His domain being the exercise of mental effort, he is unable to still the activity of his brain as his men can their hands. He cannot cast aside his worry and anxieties as the men do their tools and overalls. Hence the thoughts of his works are ever present in his dwelling, and of such thoughts, it cannot be gainsaid, many are devoted to the welfare of his employés. Over his dinner-table it will give him great pleasure to recount to his wife something of his meritorious workers. He may tell her that he has his eye upon a bright and conscientiously working young man, whom he has booked for promotion at Christmas. But how much could such be facilitated in a small, well-regulated town! There he would become ac-

quainted with the mode in which the bright young man spent his evenings. As a member of the Committee of the Technical Institute, he would be aware that his employé was a student, that the subjects he studied were those calculated to help him in his daily work; hence his view would be confirmed that that was the right man to be advanced. Again, he might know that another of his men, not quite so steady as could be wished, was engaged to a young woman who was distinguishing herself, in the same Polytechnic, in the acquisition of domestic knowledge; and, feeling that she could wield a good and steadying influence over him, he (the master) could stretch a point to promote him also, thereby to ease matters for him in his matrimonial life.

In order to obtain to a position in business such as will yield a good return and an apparently secure income, a long and toilsome struggle is almost invariably necessary. The very conditions of maintaining such struggle and attaining success are calculated to harden the feelings, and hence we almost invariably find old men who are, or have been, long engaged in business not only hard-headed, but inclined to be inconsiderate, their brain tissue being superpermeated with the instinct of money-making. Now, such men are hardly in a good condition to brook opposition from their employés arising from ignorance of business con-

ditions; but if those employés were a part of the business, all and several—master and man—could take council together, and the unreasonableness of proposals could be made apparent.

Beside direct influence, there is an unconscious influence exerted by the rich upon the lives of the poor. 'Whether they recognise it or not, and whether they wish it or not, the lives of rich people will—for good or for evil—largely mould the lives of the poor with whom they are connected, however remotely. We may see this most obviously in some of the phenomena of dress.' The less said about the London operative in this regard perhaps the better. He presents a most unpleasant contrast to his *confrères* upon the Continent. There in Berlin, for example, one may travel in a tramway-car sitting apparently beside a well-dressed clerk; but in visiting an electrical works, for instance, we may witness that same man walk in, remove his coat, take from his peg a suitable and serviceable blue blouse, and, slipping it on, light his cigarette and proceed to his work as if the expenditure of his skill upon it were pleasing to him, and not merely entered upon for his livelihood. The British workman, on the other hand, usually goes to and fro to his work in his working clothes, he demands costly and comfortable tram-cars and cheap—and, as other people would wish, cleanly—railway-carriages, and he soils the cushions with his unbrushed clothes, whilst, as he almost invariably neglects to wash on leaving his

work, he presents an appearance in public decidedly to his own disadvantage. His feeble *amour propre*, moreover, does not carry him to the length of divesting himself of his work-clothes in order to enjoy his evenings—which, it must be remembered, are often long, far longer than the average brain-worker. In this regard, however, he may be entitled to a measure of our sympathy, for he may argue, and rightly, that his clothes are good enough for the 'pub.' If, however, we peep into the recreation-rooms of Garden Villages, where the doings of the artisans are known and duly appreciated — in a manner impossible when he forms but an atom in the sea of urban industrial life—as one is enabled to do by means of some of the illustrations, we see him neatly and cleanly attired; there he is sober and wholesomely spoken, fit companion for any visitor of any social grade who may look in to have a game of chess or billiards with him. The British bachelor working man is the most extravagant being extant; were he to cultivate prudence in expenditure, he would have ample to dress well.

But mistaken notions concerning dress are small matters when ranged beside mistaken notions as to the true social status of his calling. The calling of the artisan is just as honourable as the calling of the statesman if both, with perfect integrity, are striving their best to win individual respect and national prosperity. Pride in dress is absent because pride of place is wanting. Instead of the average working

man being proud of being a unit in an industrial country in which his *confrères* have built up a vast empire, he has a tendency to evince false pride in seeking to cloak his status by the wearing of cast-off dress of a socially higher type. For this the low standard of mediocre equality insisted upon by trades-unionism is largely responsible. As long ago as the Trades Unionist Congress of 1885, Edwin Chadwick impressed upon trades-unionists the importance of raising the standard of individual deportment, discipline and alertness by the civil drill of children upon the military basis, to enable them the better '*to meet the increasing demands for more fitting labour in arts, manufactures, and commerce.*'

'Let a trade-unionist consider what the military drill will do for his son. In the first place, it improves his walk, and enables him to move from point to point quicker with the same amount of force. Let the difference of the set-up and movement of drilled and undrilled boys be observed. The drill makes the boy tread more evenly, and saves shoe-leather. School-teachers who have been trained in the military drill state that they find they now save a pair of boots a year by not treading unevenly as they used to do. The even tread saves trousers by throwing up less mud upon them. These lifelong economics will be comprehended by mothers through the tailor and the shoe-maker. *Trades-unionists may slight them as not being in accordance with their policy of doing what is good for trade.* But the drill conduces

to qualities of a high moral order and value, denoted by the term discipline—patience, order, self-restraint, prompt and exact obedience.'

This mistaken view of the honourable position held by industry is the cause of some of our industries having been allowed to pass entirely into the hands of foreigners. In reproduction, in fulfilling natural needs, there should be but little distinction in regard to the status of the effective units; yet there are certain callings which most unfortunately and egregiously have come to be considered as un-Englishlike, and we see the effect in regard to our waiters, as also in the occupation of hair-dressing and the important calling of restauranteurs. The very numerous units constituting these three professions are now almost wholly derived from foreign sources.

No rapid or universal advance will be possible until the value of temperate habits is brought home to the mass of our workers. But much may be accomplished locally by means of well-regulated industrial communities. Prohibition in this respect would but add fuel to the flames, but a beneficent compromise could rapidly be brought to ply by means of that best of all teaching, the force of example. And such example can only be efficiently displayed by social intercourse of master and man. In giving evidence before the Royal Commission, Sir Edwin Chadwick said: 'With respect to the manufacturing classes, it appeared to be acknow-

ledged, on the concurrent testimony of all considerable employers of labour, that the best informed of their workmen, the best educated, were uniformly the most sober and valuable. The absence of education was commonly attended with an incapacity of husbanding wages and of using high wages. Under such circumstances high wages were declared to be injurious rather than otherwise, the uncultivated and improvident having no idea of economy nor of laying by for times of need. Stagnation to them meant ruin ; a fall produced the sensation of a tax ; a rise drove them into sensual excesses—excesses which are fatal to the health, industry, and contentment of all who, for want of education, have no fund of self-amusement, no refined tastes to gratify.'

One other word concerning the relationship of man and master must suffice. I have elsewhere drawn attention to the fact that the ever and necessarily increasing introduction of machinery, whilst having the desirable effect of relieving men of arduous toil, also has the effect if left to itself of developing human machines. This can at once be remedied by the antidote of extraneous instruction and social intercourse, so much more easily brought about in these Garden Cities. But what I wish to draw attention to is the mistake and deleterious result of viewing workmen in the light of machines only. Unfortunately, in this country, until quite recently, ignorance on the part of the

vast majority of the workers has entirely prevented any other course being taken. Many of our more enlightened mechanics have emigrated, and the higher standard of intelligence to be found among operatives in the United States and elsewhere has permitted of quite a different mode of treatment being accorded to them. Instead of their being looked upon as purely muscular factors, opportunities have been given for the exercise on their part of cerebal effort, intended for the mutual benefit of master and man. It is, then, with great gratification one sees glimmerings of the introduction of this common-sense and mutually beneficial system upon this side of the Atlantic.

There are several methods by which this desirable exchange of views between men and principals have been carried into effect. Of these, perhaps the best plan is that known as the 'Suggestion Bureau.' This is a system by means of which not only can workmen convey suggestions for improvements in the works – be they mechanical, constructive, social, or administrative—but that the men may be suitably remunerated for such suggestions, if they be of value. The system is best carried out in a *quasi*-mechanical manner. An apparatus—called a 'suggestion-box'—is provided in each department, similar in construction to a recording-till. This consists of a metal cabinet containing a roll of paper and copying carbon, the paper being exposed at the upper side, so that it

may be conveniently written upon. An employé desiring either to register a complaint or make a suggestion for improvement writes his communication, and then turns a handle so that the written matter disappears within the cabinet. According to the nature of the communication, he may make it anonymously or sign his name. Each *communiqué* is numbered and dealt with by the principals, after consultation and discussion with the heads of the departments. At first, as is invariably the case with any innovation in this country, the system was looked upon with suspicion. For example, W. T. Stead suggested that it was a means of 'tapping the brains of labour' to the masters' advantage; he appeared to have overlooked the fact that it rested solely with the workman whether or not he chose to make use of the means for obtaining a bonus. It has recently become more largely used, but at first the suggestions were of the most frivolous and useless nature, the advantages not being appreciated, and the means of intercourse not being taken seriously. However, when it came to be seen that suggestions made by workpeople were put into practice for their benefit, and that the prizes obtained for them were substantial, the more frivolous suggestions were discontinued, and the seriousness and quality of the fewer sent in much enhanced. At the end of the year a *reunion* should take place, at which the money prizes are awarded and certificates of award given. The

nature of the suggestions are explained to the audience, and those who may have made meritorious suggestions and brought about beneficial change are at once lifted above the general level in the estimation of masters, superintendents, and men alike.

The level of mediocrity and equality so vehemently sought after by the socialists and trades-union leaders is not appreciated or sought for by the honest and respectable operative; he understands something of the pleasures of emulation, and witnesses the beneficial results arising from conscientious and emulative effort. And in this relation nothing assists the well-doer and the aspirant to self-improvement and advance so much as the existence of a literary means of intercommunication of their thoughts and views. The debating-room is excellent, but it is limited to the few who are gifted with histrionic ability. The 'Works Magazine' is far better, for it is of more universal utility; it reaches the eyes of the women as well as the men; it enables wives, sons, daughters and affianced to learn of the doings of those they may admire. It is, however, an admirable device restricted to large works. What is wanted is a magazine—the same title would be quite appropriate—which would circulate throughout and elicit the views and opinions alike of operatives and masters in *all* the factories of the town. To carry this into effect, obviously the conditions obtaining in Garden Cities would prove

most advantageous. In addition to the village doings, the magazine should contain the biographies not only of the successful masters—for it has been estimated that 95 out of every 100 of those who start in business fail—but also of successful workmen, a successful workman being not only one who rises above his fellows, but also those whose lives are successful in themselves and example-setting. 'People seldom improve when they have no other model but themselves to copy' has been wisely said. I question whether a more valuable series of books has ever been written than those of the late Dr. Smiles. When unsuccessful, rejected, and despondent, I know of no more effective antidote than an hour with them. In like manner to the conscientious, though it may be wavering, worker, there is nothing more bracing to the sinews of endeavour than the study of the difficulties that have been met and surmounted by others, especially those with whom we may be acquainted. Such study teaches us

> 'That life is not as idle ore,
> But iron dug from central gloom,
> And heated hot with burning fears,
> And dipp'd in baths of hissing tears,
> And batter'd with the shocks of doom
> To shape and use.'*

The benevolently inclined might invest a considerable sum in an organization, the operations of

* Tennyson.

which would be confined to each City, partaking of the nature of a co-operative club or friendly society. This they would do by taking a number of shares carrying a fixed *maximum* rate of interest—let us say at the rate of 3 per cent. per annum. This sum would be invested by the Board of Directors in shares of the local businesses protected under the Limited Liability Acts, 1862-1900. The citizens would be invited to make use of such organization for banking purposes in the ordinary way, their current accounts, of course, as is usual, carrying no interest. The poorer citizens would be encouraged to become depositors by means of the 'collecting-book,' looked after by district visitors, a system which has already proved so successful and been attended with such beneficial results. This class of depositor would, however, be entitled to interest on his deposit in a precisely similar manner to the system in vogue in the Post Office Savings Bank, except that he or she would receive interest at the rate of 5 per cent. instead of 2 per cent. The effect of this, it will be seen, would be that whilst the poorer classes of depositors would receive a rate of interest returning to them a substantial advantage from their thrift, they would, at the same time, practically become shareholders in not only their masters' business, but in nearly all the industrial concerns of the City.

In order that this might be forcibly brought

home to them, I would suggest that the bonus system of payment in works should in all cases be resorted to,* and that the bonuses, instead of being paid to a man with his weekly wage, should be placed to his credit in a special account—called the 'Bonus Pension Account' in this organiza-

* This method of paying wages upon the 'Premium Plan' originated in certain engineering shops in the United States, in which wages were paid by the day for a day's work of so many hours. For this day's work a man was expected to turn out a certain number of machined parts; now, it was evident that a good man could do more than this number in the day, and to encourage this a system of payment for extra work was adopted. The time taken for any one operation was carefully worked out from former experience, and work was given out to a man with a card on which the average time taken in the shop to perform the work was marked. For every hour or part of an hour he saved on this work he received a certain premium payment. As an instance, a man had given to him instructions to make eighteen articles, each requiring—according to former shop practice—10 hours; he accomplished his task in 1·26¾ hours, having saved no less than 53¼ hours on this job. As he was paid a premium equivalent to 10 cents an hour, he received $5·32, or £1 2s. 2d., over and above his wages for the time taken—*i.e.*, in two weeks and two days he had earned that amount in addition to his ordinary pay. The manufacturer is enabled to offer these advantages to his men by reason of a saving, not only in wages, but also by the reduction in capital outlay and in general running expenses. So great is the advantage reaped from *increased output* that in the large factories in the States very liberal premiums are offered, so liberal that in many cases the masters voluntarily give up to their men all gain accruing from the saving of time. (For details the reader is referred to a paper read by Mr. James Rowan, of Glasgow, before the Institution of Mechanical Engineers: Mins. Proceedings, March to May, 1903.)

tion — which might not inaptly be called the 'Citizen's Bank.' The moneys paid into this account would be kept as a deposit at 5 per cent. compound interest until the man should reach the age of sixty, or, if rendered physically unfit for work before that age, until such time as he became incapable of supporting himself.

At the age of sixty the workman, who might well look forward to a few years of quiet, peaceful life in which to enjoy the fruits of his labour, would be given the choice of three things—(*a*) he might either receive the interest of his accumulated bonuses in weekly payments from the bank, or (*b*) he might purchase a life annuity for himself, or (*c*) a joint life annuity for himself and his wife. If he chose to live on the interest he would be enabled to leave the capital sum, on his death, to his family or to whomsoever he wished. But in no case would he have the capital sum paid to himself, it being understood that, as a reward for his industry, he had earned himself a pension to enable him to finish his life in peace and comfort.

In order that the effect of this payment, month by month, of bonus sums into the special account may be better grasped, I have compiled the following tables. The first shows the effect of placing sums ranging from one penny to four shillings per week into the account at compound interest for a number of years.

TABLE A.

No. of Years.	Amounts accumulated by Weekly Investments at 5 per Cent. Compound Interest of																													
	1d.			3d.			6d.			9d.			1s.			1s. 3d.			1s. 6d.			2s.			2s. 6d.			3s.			4s.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
5	1	3	11	3	11	9	7	3	7	10	15	5	14	7	4	17	19	2	21	11	0	28	14	8	35	18	4	43	2	0	57	9	4
10	2	14	6	8	3	6	16	7	0	24	10	6	32	14	0	40	17	6	49	1	0	65	8	1	81	15	0	98	2	1	130	16	2
15	4	13	6	14	0	6	28	1	0	42	1	6	56	2	1	70	2	7	84	3	1	112	4	2	140	5	2	168	6	3	224	8	5
20	7	3	3	21	9	10	42	19	8	64	9	8	85	19	5	107	9	3	128	19	1	171	18	10	214	18	6	257	18	3	343	17	8
25	10	6	9	31	0	5	62	0	10	93	1	3	124	1	9	155	2	2	186	2	7	248	3	7	310	4	4	372	5	3	496	7	2
30	14	7	10	43	3	8	86	7	4	129	11	0	172	14	9	215	18	5	259	2	1	345	9	7	431	16	10	518	4	3	690	19	3
35	19	11	4	58	14	1	117	8	3	176	2	4	234	16	7	293	10	8	352	4	10	469	13	3	587	9	4	704	9	10	939	6	6
40	26	3	5	78	10	4	157	0	9	235	11	1	314	1	7	392	11	11	471	2	4	628	3	2	785	3	11	942	4	9	1,256	6	4
45	34	12	0	103	16	0	207	12	1	311	8	2	415	4	4	519	0	4	622	16	6	830	8	9	1,038	0	8	1,245	13	0	1,660	17	7
50		7	2	136	1	6	272	3	0	408	4	6	544	6	1	680	7	7	816	9	1	1,088	12	2	1,360	15	2	1,632	18	3	2,177	4	4

If, at twenty years of age, a man commenced to have these bonuses paid into his account, he would, of course, at sixty years of age have the accumulation of forty years to his credit, *plus* the interest accrued. Now let us examine what benefit he could be enabled to reap *without sacrificing a single penny of his wages earned in his lifetime.* It has been found in America that a man can easily earn an average of 10 per cent. beyond his weekly wage by way of bonus. On a wage of only a pound per week this would then amount to two shillings per week. Now this, by the system I suggest, when he should have arrived at the age of sixty, would amount to a capital sum of £628 3s. 2d. If he had a family, and chose to retire from work on the interest of this sum, he would, at 5 per cent. rate, be able to draw a pension of 12s. a week, and yet be able to leave the accrued capital sum mentioned to his family.

If, on the other hand, he chose to have purchased for him a life annuity, this (at the rate allowed by the Government—viz., £8 14s. per cent.) would produce for him on retiring an income of no less than a guinea per week for the rest of his life, an amount in excess of his earnings, upon which this calculation is based; or should he prefer an annuity purchased for both himself and his wife, then, during their joint lives, they would receive 19s. 8d. per week; and if the husband survived the wife, he would receive 10s. 6d. per week, whilst in the case of the wife surviving the husband, she would receive 9s. 2d. per week for the rest of her life.

TABLE B.

Sum Saved per Week for Forty Years.	Accumulates at 5 per Cent. to a Capital Sum of—	Which at 5 per Cent. Interest gives a Weekly Income of—	OR WHICH, IF INVESTED IN THE PURCHASE OF AN ANNUITY, GIVES A WEEKLY INCOME—				
			For the Life of a Man of Sixty Years—	For the Life of a Woman of Sixty Years—	For the Joint Life of a Man and his Wife—*	Leaving to Man after Death of his Wife—	Leaving to Wife after Death of her Husband—
s. d.	£ s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
1 0	314 1 7	6 0	10 6	9 2	9 10	5 3	4 7
1 3	392 11 11	7 6	13 1	11 5	12 3	6 6	5 8
1 6	471 2 4	9 0	15 9	13 9	14 9	7 10	6 10
2 0	628 3 2	12 0	21 0	18 4	19 8	10 6	9 2
2 6	785 3 11	15 1	26 3	22 10	24 6	13 1	11 5
3 0	942 4 9	18 1	31 6	27 6	29 6	15 9	13 9
4 0	1,256 6 4	24 1	42 0	36 8	39 4	21 0	18 4

* For the purpose of this table the age of man and wife are taken as equal in the usual case. Where the wife is younger, the figures in this and the last column would be less than those given here.

In Table B. is shown the effect of banking in this manner for forty years, bonuses ranging from 1s. to 4s. per week, and the annuities obtainable from such accumulated savings.

Should, however, the man die before attaining the age of sixty years, then he would leave a capital sum of no mean proportions for the benefit of his wife and children. For example, suppose a man earning £1 a week had also earned his 10 per cent. bonus regularly, and at thirty-five he should die, he would, as a result of fifteen years' saving, leave to his wife no less a sum than £112 4s. 2d.

The average wage I have taken in exemplification is, it will be observed, only that usually earned by labourers. Skilled artisans earn usually 38s. to 40s. per week. Take, now, the case of a man earning 40s. as an average throughout his life. Then we see that in retiring at sixty years of age he would have to his credit no less a sum than £1,256 6s. 4d. The whole of this sum he could leave to his family, after having drawn an income from it up to his death of £1 4s. per week. If the sum were utilized in the purchase of an annuity, his pension would then amount to £2 2s. per week, or, if it were expended in this manner for the benefit of himself or his wife, he would receive during his lifetime a pension of £1 19s. 4d. per week, and his wife for the rest of her days an income of 18s. 4d. per week.

This system, one must not omit to point out, would not in any manner fetter the workman in

regard to his freedom in changing his employer or employment. For should he leave one employer and go to another, his bonus savings at the bank would remain to him, and the new master would continue the payment of his bonuses to his account as did the old one.

Moreover, this mode of obtaining a pension would not lower his weekly wage to the extent of a single penny. We know that in many of the Government services a fixed pension follows after a fixed number of years' service; but the weekly wage has necessarily to be regulated to allow for the payment of such pension. Whereas by the system I propose every man in the City would receive the full rate of wage proper to his work, and by his industry gain something more than that rate, which would be put aside for him to form his pension fund.

This pension fund, moreover, would not be fixed as in the schemes put forward by several political and social reformers, resulting only in the provision of 5s. a week to an aged workman when he is no longer able to earn a penny for himself. But here is a scheme by which an industrious man working for forty years would, at the age of sixty, reap the reward of his industry by obtaining *a pension equivalent to his weekly wage.* For we find that a man earning £1 a week would obtain a pension of £1 1s. a week, provided he has been industrious and had earned the average bonus of 10 per cent.—*i.e.*, 2s. per week on his weekly wage. A man earning £2 a

week would secure for himself the handsome independent *income of* £100 *per annum*. The scheme, moreover, would possess the further advantage over any other pension scheme that, instead of being *fixed* and limited to a sum far too small to enable a man to retire in comfort, *the amount of the pension thus obtainable would be directly proportional to the industry of the worker.**

* The scheme of State-provided pensions is as follows:

'Any Person who satisfies the Pension authority that he

'1. Is a British subject;

'2. Is sixty-five years of age;

'3. Has not within the last twenty years been convicted of an offence and sentenced to penal servitude, or imprisoned without option of a fine;

'4. Has not received poor relief other than medical relief, unless under circumstances of a wholly exceptional character, during twenty years prior to the application for a pension;

'5. Is a resident within the district of the Pension authority;

'6. Has not an income from any source of more than ten shillings a week; and

'7. Has endeavoured to the best of his ability, by his industry or by the exercise of reasonable providence, to make provision for himself and those immediately dependent upon him, shall receive a certificate to that effect and be entitled to a pension.'

The Pension authority would be 'a special Pension' Committee, appointed, in the first instance, by the Guardians, 'with power to add to their number.' The pension would be fixed at the discretion of the Committee, and amount to not less than 5s. or more than 7s. a week.

The Committee's definition of the class for which it would provide is of interest, however, in this connection. They 'desire to provide for the following: 'Many aged people who only accept relief under pressure of illness or severe distress, and

It may be justly urged that there are times in a man's life—when illness steps in at his door, and from other reasons—when the ability to possess himself of an extra pound or two in cash might be highly beneficial to him, and that for this purpose he might be allowed to draw on this bonus fund. This is true; but in his interests, it is clear, facility to draw upon this pension fund must be avoided, from the consideration that a *very small* sum withdrawn at the early part of his career, say the fifth year of cumulative deposit, makes a *large* difference to the amount accumulated at the end of the term—the fortieth year. In the system referred to below, as practised by Herr Van Marken at Delft, he allows, *on certain special occasions*, drafts to be made on the premium fund,* and some similar arrangement might

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often endure great suffering to avoid it'; 'those who are kept off the rates by the assistance of friends and of private charity'; and 'poor and aged people who are known to the Guardians to be deserving,' and are in receipt of outdoor relief. If this class could be accurately defined, and the terms of the scheme equally accurately stated, the pensioners would evidently form themselves into a new social class—a second-grade poor endowed with special financial privileges.

* In the factories established by Herr Van Marken at Delft, the premiums and share of profits payable each quarter to the different workmen are deposited in a 'Premium Savings Bank' up to a certain amount, and the balance paid in cash as follows:

Young men under 18 pay to bank	...	90 per cent.
Young men from 18 to 23 pay to bank		75 ,,
Unmarried men over 23 pay to bank	...	50 ,,

be made in a Garden City fund; but it were better to strenuously avoid it, it were better to inculcate the principles of forethought and thrift, by means of membership of a 'friendly society' or 'sick club' against such contingencies, than to allow drafts to be made on this special or 'Bonus Pension Fund.'

But I propose that this 'Citizen's Bank' should play the part of club or benefit society, and the object of the ordinary account—which is also a means of enabling that excellent institution, '*the*

Married men without children pay to bank	40 per cent.
Married men with one child under 15 pay to bank	30 „
Married men with two children under 15 pay to bank	20 „
Married men with three children under 15 pay to bank	10 „

Married men with four children under 15 receive their premiums and their proportion of profits in their entirety in cash.

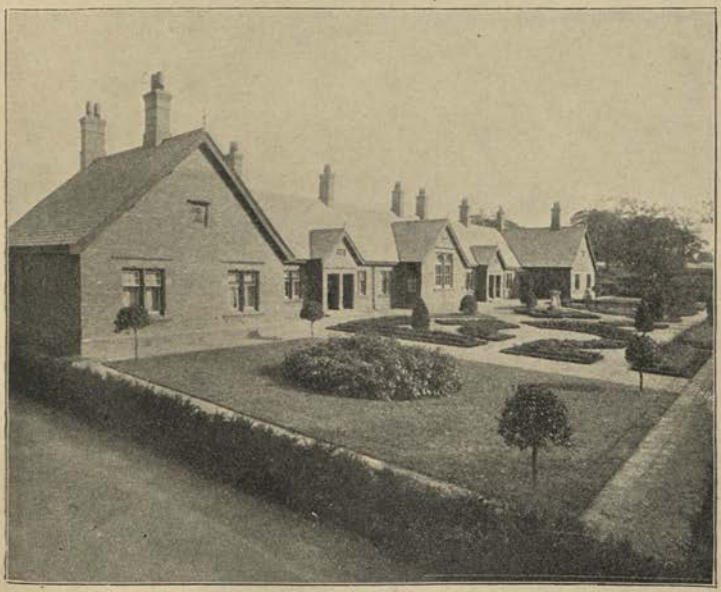
The withdrawals allowable, as mentioned above, are: On marriage, a sum equal to twenty-five weeks' wages, provided such an amount has accumulated; on the accouchement of the wife of a workman, a sum equivalent to two weeks' wages; whilst on the death of the workman the sum is divided equally between the widow and the children. At sixty years of age, if a man retires, he is entitled to withdraw the whole of these savings; but if he continues to work after he is sixty years of age, then the withdrawal is postponed unless the directorate allow it under some special circumstances. As the firm also provide from the annual wages for a pension fund, these compulsory savings are a nest-egg to add to the benefit of the pension.

*collecting-book,'** to be brought into play—is to enable the workman or workwoman to have something to fall back upon on special occasions, be they troublous times or happy epochs—such as upon marriage. In regard to marriage or the annual holiday, the workers would have their current account to draw upon, whilst in regard to trouble, the bank, it is obvious—on ample evidence that the occasion was urgent, and that the need for extraneous help was genuine—might make advances upon the security of the applicant's deposit in the 'Bonus Pension Fund,' allowing the mortgage, as it were, upon this to be gradually amortized by gradual repayment made into the current account. On the other hand, an artisan earning money extraneously —as, for example, by evening handicraft or from his garden—should be accorded the privilege of transferring money from his deposit account to his 'Bonus Pension Fund' account. It is abundantly clear that the spending of two months' wages in drink is as unnecessary as it is otherwise injurious; a considerable proportion of this might be paid in to his banking account. Again, as I have elsewhere shown, the amount paid into the 'holiday fund' is very large, showing that the operative can save when he likes; but I have also mentioned that the non-appreciation by operatives of the true principles of thrift leads them to lavish their money during holiday time without commensurate advantages to

* See p. 595.

Façade of the Almshouses, Bournville.

Garden Quadrangle of the Almshouses, Bournville.



Stone-built Almshouses in the Model Village of Nidd, Yorkshire.

themselves. From this source also further addition to the Pension Fund account might be made. Workers should remember the old adage: 'A pin a day will fetch a groat a year.'

The annual report presented by the Chief Registrar of Friendly Societies possesses importance both from a legal and social standpoint. At the end of 1902 it is to be seen that more than forty-four millions of persons were directly interested in the various forms of provident societies of Great Britain and Ireland. The capital moneys concerned amounted to the huge total of something like £531,000,000. Surely, says the *Law Times*, such figures should give pause to those light-hearted legislators who propose to divert the minds of the labouring classes from well-tested means of providing for the future in favour of more specious proposals.

As far as possible, I would make insurance for old age annuity compulsory in Garden Cities.

In a paper presented to the British Association of Science (Southport, 1903), Sir Robert Giffen stated —on the basis of recent investigations—that the aggregate income of the people of the United Kingdom may be placed at about 1,750 millions, and the aggregate wealth at about 15,000 millions. The data as to the rest of the Empire are not so familiar, but the aggregate income of the whole Empire is put at 3,130 millions, including 270 millions for Canada, 210 millions for Australasia, and 600 millions for India. The corresponding

capital for the whole Empire is assumed at 22,250 millions, including 1,350 millions for Canada, 1,100 millions for Australasia, and 3,000 millions for India. The expenditure of the people of the United Kingdom at the present time is summed up in the following table:

	Million £.	Per Cent. of Total.
1. Food and drink	468	34
2. Dress	182	13
3. House	223	16
4. National Services (exclusive of education)	183	13
5. Miscellaneous (including education)	130	9
6. Cost of distribution	200	15
Total	1,386	100

'Nothing succeeds like success,' and assuredly there is nothing so mentally sedative as success to the normal-minded, nothing which will more readily open the flood-gates of benevolence. But the benevolence need not necessarily take the material shape of money: it may take the shapeless form of something far more valuable — the imparting to others something of the 'secret of success.' I cannot, therefore, I think, do better than to supplement the few remarks I have ventured to make concerning man and master than by a quotation from a successful life, being upon the conduct of

The Grocery Stores, Agneta Garden Village, Holland.

A Modern 'Stores' in an Indian Village.

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The Clothing Store, Van Marken Garden Village.

business and the relations which should subsist between man and master.

In his Presidential Address delivered to the members of the Iron and Steel Institute *—after having pointed out that the great industry had had its birth in England, and became established through the operation of the inventions of Darby, Huntsman, Smeaton, Cort, Watt, Stephenson, Neilson, and Nasmyth; that it was not strange that the inventive and mechanical should have taken precedence of the commercial element in the beginning; and that when the joint-stock form came the business element in the United States naturally took first place, Mr. Carnegie said:

'It may be doubted whether the superintendent of any works under joint-stock management there in these early days had a seat on the board, or any reward beyond a fixed compensation, or was called to the main office for counsel upon any question not strictly mechanical. Probably there was not one foreman or important man recompensed in any form beyond fixed salary. The admission of young partners without capital was unheard of. The joint-stock form does not lend itself readily to the substantial recognition of exceptional service from the exceptional man, or of payment based upon results in departments, yet it is in this direction that the most important changes have come in the business department.

'Speaking from experience, we of the Carnegie Steel Company had not gone very far in manufacturing before discovering that perfect management in every department was needed, and that this depended on the men in charge. Thus began the practice of interesting the young geniuses around us, as they proved their

* At the Institution of Civil Engineers, May 7, 1903.

ability to achieve unusual results, the source of big dividends. These received small percentages in the firm, which were credited to them at the actual cash invested, no charge being made for goodwill. Upon this they were charged interest, and the surplus earned each year beyond this was credited to their account. By the terms of the agreement three-fourths of their colleagues had the right to cancel it, paying the party the sum then to his credit. This provision was meant to meet possible extreme cases of incompatibility of temper, or of the recipient proving incapable of development, or of enduring prosperity. At death the interest reverted to the firm at its book value. The young men were not required to assume any financial obligation, and not until their share was fully paid by the profits, and there was no further liability upon it, was it transferred to them. Thus thoughts of possible loss never prevented concentration upon their daily duties. They were not absorbed in the daily quotations, for the shares were not upon Stock Exchange or transferable. This policy resulted in making some forty odd young partners, a number which was increased at the beginning of each year.

'By this plan they were rapidly paying for their interests, and promising to become millionaires of the then seemingly somewhat distant future, which, however, proved not so very distant. They are now rich men. You will not fail, however, to note that the plan kept them all in excellent training, as poor men still living upon their salaries; millionaires in *posse*, indeed, but not in *esse*—quite a difference, for millionaires seem liable to develop when still very young so many hitherto unsuspected weak spots in their constitutions requiring careful nursing, and many absences and short hours, and a dozen other impediments to hard, continuous exertion, that it does not seem good for their robust health that they should be unduly burdened before reaching middle age. The zest of the chase is over too soon. It will be found the exception when a millionaire employé strains himself unduly by over-exertion in the mill or office. Nor should he be expected to do so. He has earned the right to some leisure for self-improvement. When a man has achieved a competence, new

duties to his family and to himself arise. Money is properly only the means to an end.

'We did not fail to see as the works enlarged how much success depended upon the mechanical men, the superintendents, and foremen, yet not one of these had up to that time been admitted as partner. The business and the mechanical men, office and mill, were still widely separated. Well do I remember the first attempt to bring these two departments into closer relations. It was made with our Captain Jones, one of your members, well known and appreciated by many of you as in the foremost rank of managers, perhaps the foremost of his day in America. He came to us as a working mechanic at eight shillings per day. I explained to the Captain how several of the younger men in the business department had been made partners, and were actually receiving much greater rewards than he, while his services were at least equally valuable, and informed him that we wished to make him a partner. I shall never forget his reply: 'Mr. Carnegie, I am much obliged; but I know nothing about business, and never wish to be troubled with it. I have plenty here to trouble me in these works. Leave me as I am, and just give me a thundering salary." "Hereafter," I said, "the salary of the President of the United States is yours, Captain," and so it remained until the sad day of his death. My seniors, the presidents of the other manufacturing concerns, did not fail to take me to task for ruining the steel business by paying a mechanic more salary than any of them received. Being much the youngest of these great dignitaries, I humbly confessed my wrongdoing, not, however, failing to inquire if they knew where we could find two or three more Captain Joneses at double the price. We did not overpay the Captain; he was worth several ordinary salaried presidents. The Captain's refusal of partnership was the only one which ever came within my experience. None of the other mechanics ever preferred salary to partnership, and they were wise. Nothing can compare with that form. Let me impress that upon the younger members here who may soon have, or should have some day, the choice laid before them.

From that time forward the union of the mechanical and business partners went steadily forward, until no manager of a mill was without his interest in the business, as pertaining to the position, and no board of management or important committee was without a mechanical representative. Thereafter mill and office conferred upon all important sales or contracts. The mechanic and the man of affairs were in constant consultation and fellow-partners—one of the most profitable changes that we ever made.

'There was another step taken in the same direction. Men having others under their charge were given an interest in the proceeds, or savings in cost in their department. Where it was impossible to decide the limits of a department, the managers were rewarded by handsome bonuses beyond their salary based upon the general profits of the year. Thus, as a rule, every man in authority became more than a mere wage-earner. He felt himself on the first step of the ladder which led to partnership sooner or later, and was worth any two mere employés paid only a daily or monthly wage and denied special recognition.

'This plan of reward according to results for heads of departments has already become so general and is spreading so fast that we may be sure it has proved its efficiency. There are few department stores or important houses in retail trade which have not been forced to adopt it.

'This plan is probably bound to prevail in greater or lesser degree in manufacturing concerns, and the sooner the better, for the greater number of the workers capital can compensate, and in one sense reward, by sharing its gains, the more harmonious, and therefore the more profitable for both, must the relation become.

'The great secret of success in business of all kinds, and especially in manufacturing, where a small saving in each process means fortune, is a liberal division of profits among the men who help to make them, and the wider distribution the better. Unsuspected powers lie latent in willing men around us, which only need appreciation and development to produce surprising results.

Money rewards alone will not, however, insure these; for to the most sensitive and ambitious natures there must be the note of sympathy, appreciation, friendship. Genius is sensitive in all its forms, and it is unusual, not ordinary, ability that tells even in practical affairs. You must capture and keep the heart of the original and supremely able man before his brain can do its best. Indeed, this law has no limits. Even the mere labourer becomes more efficient as regard for his employer grows. Hand service or head service, it is heart service that counts.

'One of the chief sources of whatever success may have attended the Carnegie Steel Company was undoubtedly its policy of making numerous partners from among the ablest of its men, and interesting so many others of ability in results. I strongly recommend this plan to the members of the Institute engaged in business, believing that in these days of ever-increasing competition it will be the concerns which adopt this plan, other things being equal, which *will* survive and flourish.'

It is certainly sad to reflect that trades-unionism —in principle admirable in the interests of craftsmen —should by abuse have become inimical to their interests, as also to national prosperity. Instead of making for a better understanding as between man and master—a so desirable and necessary *desideratum*, as Mr. Carnegie has pointed out—it is invariably made use of to frustrate those amicable relations, which are of the essence of nationally efficient reproduction. What is wanted in place of them is a recrudescence of the Guilds of Handicraft, the forerunners and ancient prototypes of the trades-union associations of to-day, one of the characteristic tenets of which was the inculcation of honesty and integrity of workmanship, when every craftsman

took pride in his work, and set his mark on every stone—marks which are recognised to this day as signed pictures by a Royal Academician.

Having regard to all I have felt impelled to say in this regard and under the head of man and master, I would venture to repeat what I have already said in the preceding volume, that, seeing that the number of artisans required for the first Garden City is so small relatively to the vast number available, a fair field and chance should be afforded to free labour men to push their way forward, there unimpeded by the thraldom of the unionist agitator, the better to enable master and man to work in amicable accord, and bring to speedy fruition the germs of social facilities which by them would be sown in a manner giving justification for hopeful anticipation such as has never before been seen.

Thanks to the common-sense, combined with patriotism, of the honest workmen of Great Britain, the authorities of Garden Cities would to-day be unable to find an excuse for the non-employment of free and unfettered Britons. As long since as twelve years ago some of the large section of sober, right-minded, and well-desiring workmen federated themselves for freedom's sake and formed the nucleus for the now important industrial inorganization known as the 'National Free Labour Association.' Through its instrumentality a large number of great and unwarrantable strikes have been made to speedily collapse, thereby preventing deplorable industrial devastation

and avoidable distress. The Association embodies the principles I have ventured to lay stress upon, not the least important being the maintenance of proper touch as between man and master. Their motto is as nationally important and as patriotic as it is individually beneficial 'for the unity of capital and labour, trade without restraint, and industry without restriction.' It also claims 'liberty to work, liberty to employ.' That this is no vain boast, and that the work of the Association is not only earnest but efficient, is proved by the fact that in two years and nine months no less than fifty important strikes were utterly defeated by free labour, and workmen possessed, it should be remembered, of properly authenticated certificates of recommendation, were forthcoming to fill the places of the dissatisfied and work-shy strikers. Such work and victory, moreover, was not accomplished without a fierce and meritorious fight, and perhaps there is no more degrading exhibition in the world than the museum of villainous weapons—facetiously referred to as *trades-union* '*arguments*'—exhibited at the Free Labour Congress. These maiming instruments, such as iron bars, bolts tied at the ends of long thongs, hammers and pickaxes, were not only used to batter and maim working men who preferred work to starvation, but they were driven into the points of tramways and railways for the purpose of dealing death and destruction. The Association is composed of both masters and men; the former subscribe, and the latter administer the

funds and carry on the work of the Association.* And it should be with a feeling of unalloyed relief and satisfaction all well-wishers of their country should learn of the ever-increasing strength of the so-much-to-be-desired Association.

The reader needs not again to be reminded that mere money payment is not everything; elevating influences, happy surroundings, and comfortable, pride-inspiring homes, count for much in regard to industrial happiness.

Perhaps the least satisfactory feature of Garden Cities as proposed, is that the citizens would be debarred from acquiring the freehold of their dwellings because of their inability to purchase the land. I would therefore recall the fact that this was found a disadvantage in Pullman City, and suggest that the disability should be got over by purchasing and setting apart for resale to the retiring workers land suitable for the erection of dwellings to be acquired by the purchase schemes referred to. Were the principles known to be necessary to be complied with for the fulfilment of the economics of production inculcated and adhered to in Garden Cities, they would present a unique opportunity for the subsistence of mutually beneficial and amicable relations between man and master.

* The chairman, Mr. Chandler, is a working man, the energetic secretary Mr. W. Collison, and London headquarters are at the 5, Farringdon Avenue, E.C.

MUNICIPALITY AND MONOPOLY.

'The individual may consume his capital, the community cannot.'

In contemplating the organization of a new city, a question of great import demanding serious thought is, How far would the city be justified in encroaching upon the domain of the private individual in the fulfilment of its requirements? In this, as in the case of temperance and other reforms, drastic measures are to be deprecated, as tending towards disastrous financial results. The principle must ever be borne in mind that the State, as trustee for the money of the people, can take no risk; that it must confine its operations to the maintenance of itself; and that, whilst it should offer all facility in its power for the development of private enterprise, it should not embark in anything in the slightest degree speculative in its nature nor tending to hamper the energies of the nation or the spirit of adventurous enterprise in the individual. Now, this principle should be the guiding principle of municipal enterprise. The tendency to continuously increase

the sphere of operations in regard to what, by much ingenuity, is sought to be shown to be legitimate work for the municipality is, to say the least of it, ominous. The asseverations and professions that this or that could be better and '*more economically*' carried on by the corporation are almost invariably belied; but because the losses entailed can be so conveniently made good from the moneys of the civic multitude pouring into the corporation coffers, and do not make themselves apparent by individual bankruptcy, they remain more or less unnoticed, except by the unfortunate ratepayer, who, however, bewildered by the complexity of the machinery by which his money is spent, and engrossed in his own affairs, must needs relieve himself by a sigh and pay his ever-increasing taxation.*

I have had occasion to refer to the gratifying progress made in National sanitization, and the beneficial results obtained. But this has entailed vast expenditure on the part of the Corporations, Borough Councils, Local Boards, and such-like, and has resulted in the lock-up of a vast capital productive of but a small rate of interest. This and other municipal expenditure, some of it rash, has

* Cobden, speaking against governments and municipalities entering into commercial and manufacturing business, said: 'I find that you can never make the conductors of these establishments understand that capital they have to deal with is really money. It costs them nothing, and whether they make a profit or loss, they never find their way into the *Gazette*. Therefore to them it is a myth—it is a reality only to the taxpayer.'

caused municipal indebtedness to mount up with extraordinary rapidity within the last few years. In the past twenty years we find that the local debt has increased 120 per cent., and the annual amount of local taxation has increased 77 per cent. against an increase in the population—who have to pay the interest upon the borrowed capital—of only 23·6 per cent., whilst the rateable value of property has increased but 26·7 per cent. During the twenty years 1878-1897 the Imperial debt had fallen from £775,000,000 to £641,000,000 (a reduction of £134,000,000), but the local debt had more than doubled itself by an increase of £138,000,000, and stood at the enormous sum of £252,000,000, or, allowing for the accumulated sinking fund, £245,000,000 sterling.*

Now, supposing this money to have been well spent, and to represent a safe investment, it may be urged that it cannot be anything but beneficial, for the conditions of life have been improved. This must be granted; but the points have to be borne in mind whether the benefits to the individual are commensurate with the increased taxation, and further—as the above-quoted figures show—that this taxation is increasing more rapidly than either the population or the rateable value of added property.

* According to a recent statement of Lord Avebury, 'the indebtedness of the local authorities of England and Wales has risen from £198,000,000 in 1889-1890 to £300,000,000 in 1900-1901—an increase in ten years of over £100,000,000.'

The reasons which impel municipalities to embark in undertakings which can be, and are being, carried on by private enterprise are principally two—(*a*) the desire to secure to the ratepayers the profits arising from the sale of entities which may be embodied in a public service; and (*b*) the desire to obtain and maintain control over the operations taking place in the public streets and roads under their control, or, as it has been somewhat ambiguously put, 'to obtain as much revenue as possible for giving up the use of the streets for trading purposes.' This latter is a matter of great and ever-increasing importance, but I have, I trust, sufficiently touched upon it elsewhere.* Town councils are entitled to hold the very proper view that, seeing that the duty of the preservation of the surface devolves upon them, it should not be interfered with except by their servants. I, however, contend that in regard to the laying out of a new city streets should be so constructed that neither for the purpose of repairs to mains nor of their installation should it be necessary to break the surface of streets or roads.† The device of obtaining a profit for a town by charging a rent for the use of its streets—by way-leave—is, in my opinion, objectionable, because, by increasing the cost of the service, it penalizes certain consumers for the benefit of the general body of ratepayers.

Having, I think, dealt at sufficient length with

* See vol. i. and also Chap. IX.

† See my design for subway, Chap. IX.

the problem of how road-surface breakage may be entirely prevented in new cities, I feel I may leave (*b*) and pass on to (*a*). Should municipal enterprises pay, or should they be worked at cost price? Should they bring in where possible something in aid of the general rates of the community, or should all such aid be foregone by the general body of ratepayers?

Bearing upon this, the following remark of the Lord Provost of Edinburgh is interesting. He said: 'I wish to consider the question of "Municipal Trading" from the practical point of view of a man who takes his share in the work of a town council, and who, being in a town council, appreciates the pressure which, at the present time, is brought to bear by the body of the people on town councils, driving them to undertake trading risks; who knows something of the difficulties of municipal finance, which makes profits derived from trading very tempting; and who understands better than an outsider can how far the business of town councils can be conducted through officials in a manner likely to produce profit from trading. It appears to me that the discussion of this question of municipal trading is apt to fall into the hands of partisans. On the one side, the Chambers of Commerce say "municipal trading interferes with the legitimate rights of our members who carry on trade, and therefore the Legislature must interfere and forbid it"; on the other side, those who hold the very

latest religion—Collectivism—declare "that the future safety of society depends on corporate action driving the individual capitalist from the field, and every crusade against capital is holy and blessed." Eventually a practical and unimaginative people like the English are likely to settle the question on practical lines, and each city for itself.'

Is it necessary—or possible—that a corporation shall in the expenditure or investment of capital for general civic benefit so arrange matters that the contributaries—the ratepayers—shall, more or less, individually receive such benefit in proportion to the amount of their respective contributions—*i.e.*, approximately in proportion to the value of the fixed property occupied in the locality? A little thought will, I feel, suffice to show that such result cannot be attained. Two such considerations were dwelt upon by Lord Alverstone, when Attorney-General, in a discussion at the Society of Arts—of which he was then President—upon this subject. After pointing out that the power of corporations to make profits was quite a modern development, which even as recently as the beginning of the late Queen's reign was contrary to law, he urged that it was almost impossible to put the burden of trading on the right shoulders, and so to regulate the charge as to place no weight on those who derived no benefit. It is not possible for a corporation to make the cost of an undertaking and the charge for it exactly balance, or so to adjust its affairs that

the burden or profit of the undertaking shall only fall on, or accrue to, those who use it. Further, that if a sinking fund be provided—as in all such matters it is considered proper to do—then the ratepayers of the present must, *ex necessitate rei*, be charged for the benefit of the ratepayers of the future. Whilst, on the other hand, if no sinking fund be provided, then the ratepayers of the present would derive an advantage at the expense of the ratepayers of the future.

Municipal enterprise cannot quite be looked upon as a species of distributive co-operation, because in that case the profits are divided amongst the consumers; but in the case of municipalities the profits are divided among the subscribers—the ratepayers as a whole. It is therefore doubly unfair to prohibit the making of a profit, because not only do the consumers obtain their commodity at a lower rate than they would have been able to do by private enterprise, but the non-consuming subscriber would get no return. If there is to be no profit, it is clear that the ratepayer must, in the end, lose, because the expenses and receipts must balance each other in average years; in good years there cannot be any reserve fund instituted, for that would necessitate the earning of profit wherewith to build it up, whilst in bad years the deficit must be made up by the ratepayers. Although the country may be proud of our system of local government, and have confidence in those who conduct it,

yet it cannot fail to appreciate the immense debt it owes to individual enterprise. It ought, therefore, to be most solicitous in regard to any measures which in the least degree could have the effect of thwarting it.

The extreme advocates of Socialism may say—or even really think—that the State—and hence municipalities—can do everything better than the individual, basing their argument and policy on the fact that the State has no private interests to serve, no shareholders to consider.* But facts are against

* The 'nationalization' of railways is a favourite cry with those inclined to State Socialism, and it is put forward as a panacea for all railway ills. It so happens that Switzerland is at present acting as an object-lesson to the rest of the world in this respect, as the Federal authority bought the lines a short while ago from the private companies. One great objection urged by the opponents of the scheme was that the management would inevitably become centralized; but the supporters of State purchase declared that this was impossible in Switzerland, where all the Cantons are so jealous of their independence. But already it is said that the management will have to be centralized at Berne, and that the local control of the lines will have to be done away with, as a means of introducing economy into the working. The centralization has already increased the number of the employés, on account of the red tape which always hampers any work that the State undertakes; and the expenses, which it was said *would be reduced* by over £20,000 a year when the companies were bought out, have, on the contrary, *been increased* already by over £30,000 a year, or a miscalculation of considerably over £50,000. The rates for passengers and goods were also to be lowered, but after a feeble attempt in this direction the Federal authorities have had to postpone indefinitely most

them. Mr. Balfour Browne—the leader of the Parliamentary Bar, and a man of immense experience in private and corporation Bill legislation—said: 'I

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of the promised reforms. So that the Swiss are gloomily looking forward to a worse and more expensive service as the result of their experiment in State Socialism.

Since the above was written the Committee of Management has held its meeting for 1904 at Berne, and issued its accounts for the preceding year and its budget for next. The deficit on the working grows worse and worse every year. In 1903 the loss was about £3,500; this year it will be no less than £50,000—an enormous increase, and more than twice what was anticipated. For next year the estimates are even less hopeful, for with the best will in the world, and with every inducement to look on the best side of things, the Committee cannot hope to prevent a deficit of over £80,000. The time has gone by when the advocates of State management could promise us great extensions of the railroads, and when a large income was confidently expected from the profits of the working. The Committee has been obliged to confess that the prospects for 1906 are even worse than those for 1905, and that the policy of raising the wages of the employés, and at the same time lowering the rates for passengers and goods, has not succeeded, as it was so confidently prophesied would be the case. This is a further proof, if any were needed, that in a democratic country State enterprises cannot be managed economically, and that the business of a Government is to rule and not to compete with private undertakings.

Experience in our own colonies of the working of railways by Governments is also instructive. As an object-lesson, Victoria, New South Wales, might be taken. There the working of the railways by the State proved so disastrous that the Government appointed a Board of Inquiry. This reported 'that the service is disorganized, and that political influence is noticeable throughout. The Board recommended the complete separation of the

know there is a new school which disbelieves in the efficacy of competition. I do not agree with them. I have seen a great deal, perhaps as much as anyone, of attempts upon the part of the State to manage and regulate railways, and after a not unprofitable experience, I pronounce these efforts to be a failure.'

If an example of deplorable waste of public money by municipal authorities carrying out their own work were wanted, we should not have further to go than our own Metropolis, or rather that portion of it controlled by the London County Council. The Works Committee of this 'progressive' body—the progress, in this relation, being chiefly observable in progressive indebtedness and appalling aggrandisement of taxation—has proved itself a huge failure. After the commencement of the operations of 'the Works Committee,' those who took an interest in such matters—but unfortunately the citizens of Greater London are probably the most *laisser-faire* in the world—were astounded by the enormous excess of actual cost over the 'estimated' amount. Case after case has shown the complete inability of the Council to carry out work anything like as cheaply as private firms can do—even after the compulsory

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railways from the State, and the placing of them under a Board of five trustees with a general manager.' The Board expressed the view that this would result in a saving of £1,000 per day—£365,000. The control of tramways and omnibuses by the London County Council might also be cited in corroboration.

insertion of the wages clause—a domineering and flagrant encroachment by a public body upon the private rights and liberty of individuals. Lesson after lesson has been unheeded, for the majority has not had pluck enough to frankly admit such inability. Cases are on record in which 'Works Committee' cost has been triple and upwards that of private contract. These outrageous discrepancies, and hence waste of ratepayers' money, could not be allowed to continue, and therefore an effort had to be made to delude the public into the belief that the lessons had been taken to heart, and, by some magic, a department 'controlled by gentlemen who know very little about it,' had suddenly and materially increased in efficiency. This has been managed in a very simple manner—merely, indeed, by increasing the estimates, whereby it follows the discrepancy must evince corresponding decrease—in fact, can easily be made to disappear. This, of course, is an injustice to private competition. 'If you put your own estimates high enough, it is easy to do the work for less,' archly observes Lord Avebury, and then proceeds to cite—with the corroboration of an unimpeachable expert—the case of a 'Works Department' estimate for brickwork being £28 per rod, whilst *for the precisely same class of work* the Office of Works by jobbing contract pay but £19 2s. The fact is also mentioned that the Chairman was asked some time ago how many bricks were laid by a London County Council brick-

layer per day. He said he would inquire. When pressed again, he said '*the question was difficult to answer*, but it was *something over* 300.' In America the average is, I am informed, 2,000, rising to 2,700. No wonder the 'Works Committee' greatly exceed their estimates, taking all things into consideration! No wonder ratepayers have to pay so much more than they would if work were carried out in the normal way of business by private firms who understand their business!

The views of Socialism, moreover, in this relation have all the disadvantages inherent to monopolies, the very things they so vehemently declaim against.

To sum up, I feel that there is plenty of room for the work of both municipal bodies and private corporations or individuals acting alone or in partnership. But I would have it laid down as an axiom that municipal enterprise should be limited to the actual requirements of municipalities—*i.e.*, the removal of sewage and refuse, the supply of water, and sometimes that of gas and electricity. In the case of new towns, designed so as to embody all the advantages of applied science—especially the interweaving of the services of water, fuel-gas, and electrical energy, to which I refer more especially in Chapter IX.—then the municipality should certainly make itself responsible for the supply of the two latter necessaries of modern civilization. In other words, *municipal enterprise should be absolutely restricted to the supply of essentials.* Tersely put by

Mr. Chamberlain, the municipality should only undertake such things as it can do better than it can get done.

In his evidence before Lord Crewe's Committee, the Lord Provost of Glasgow—perhaps the most advanced city in regard to municipal enterprise—gave it as his opinion that the municipalities might safely be entrusted with, *but confined to*, the supply of things which were in their nature suitable to a monopoly, which were articles of necessity, and which required control of the streets or portions of the public property of the municipality.

Lord Alverstone, as Chairman of the Council of the Society of Arts, gave it as his opinion, as the result of his great experience, that, 'Whatever might be said as to the profit made out of undertakings, such as gas or tramways worked by corporations, his belief was that the burden on the ordinary ratepayer was less where no such risks were undertaken.'

It must ever be borne in mind that everything done in the way of municipal trading is an encroachment upon private enterprise, and deprives commerce of the advantages inherent to competition. Mr. Balfour Browne, in a speech delivered last year, said: 'I believe that competition braces the producer to enterprise and caution, and that it is one great means of sending useless things to the scrap-heap, which would, in the hands of monopoly, still be continued in use to the detriment of society. I think fair competition is the fresh air of trade. But

I do not think it is fair competition for a corporation, with the rates behind it, to compete in the open market with a private individual.'

Competition as between a municipality and private enterprise cannot but act detrimentally to the citizen. Although we have the gratifying fact that our municipal administrations are far more free than that of many other countries from corruption and jobbery, yet their attitude in regard to contractors or companies who seek concessions within their area leaves much to be desired. A perusal of the clauses of their Parliamentary applications proves, all too conclusively, that many are inserted for the sole purpose of preventing the work being done by private firms. A glaring example of this was the way in which numerous provisional orders were obtained by corporations for electric lighting and never made use of. But this is not the worst; a town councillor who is a committeeman for a public service forgets that such municipal service was instituted, not for profit-making *per se*, but for the convenience of the inhabitants, and straightway proceeds to fight any competitor who would be the means of *increasing* such convenience for the inhabitants.*

* Under the heading of 'Private and Municipal Competition,' a leading London paper thus refers to a cognate matter: 'At the meeting of the London County Council, a thoroughly vicious principle in municipal morality was enunciated and allowed to pass unchallenged. Several members asked questions about the rumoured appearance of motor omnibuses in the London streets. This advance in the popular methods of transit seems to have

Municipal enterprise, if care be not taken, will check the progress of discovery and invention; also prevent the cheapening in the cost of production of the entity. Except in the case of monopolies, competition stimulates discovery and invention; it calls for constant improvements in the modes of manufacture, of ways and means of obtaining an end in the most economical manner, in order that one firm may undercut, or at least produce at a lower rate than, another. This necessity gives rise to another—the constant improvement of and change in the plant made use of. Now, municipalities, the zest of whose managers would not be whetted by the necessity of profit-making, would have no incentive to such change—indeed, would strongly deprecate it by reason of it entailing further drafts on capital account.

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been regarded by those who asked the questions solely with reference to its effect on the County Council tramways; and the member who replied restricted himself to this point. He gave the assurance that should these motor omnibuses appear and operate along the lines of the municipal tramways, steps would be taken to see whether motors could not be affixed to the horsed tramcars, "so as to compete with the opposition." The final phrase is compact of vicious principles. It is unbearable, in law as in common-sense, that municipal undertakings should enter into direct competition with private effort, and apart from the opening for corruption, nothing but continuous irritation and great waste of expenditure can issue from the recognition of such one-sided competition. It is bad enough when municipal and private spheres of interest overlap by the accident of circumstance but it is infinitely worse when a municipal body sets out on fixed purpose to enter into rivalry with a private company.

The difference between what is essential and necessary to the well-being of a citizen in so complicated a community as ours that might be advantageously supplied by the community and what is only desirable is very difficult of definition, and the result of this difficulty of defining the limit has been that a vast extension of municipal enterprise has grown up in matters closely affecting, but not logically essential to, the welfare of the inhabitants. Water and light are clearly essentials, whilst locomotion is not. The removal of sewage is obviously a civic duty, and although London—until this year—and some other large and many small towns rely for their supply of water upon private enterprise, I contend this should be looked upon as a corporation duty. In the present state of municipal applied science the first entity cannot *per se* be looked upon as an article of commerce, though in some cases a return through its intrinsic value is sought to be made in reduction of the cost of its removal by means of sewage farms. The latter, water, has, however, an indirect mercantile value, seeing that it forms a saleable entity in the hands of both private and civic corporations and occasionally private contractors. But I do not think the supply of water can fairly be classed as a trade, and certainly not one involving, in the hands of town authorities, the ordinary risk of trade.*

* Birmingham's policy was to make *no* profit out of water, but to make profit out of gas, on the ground apparently—and a sound

Among enterprises entered upon by municipalities which may fairly be said to represent a direct, and large, encroachment upon the work previously carried on by private enterprise may be mentioned:

1. The production and distribution of gas, and the sale and hiring out of gas-stoves for cooking.

2. The production and distribution of electricity for public and private lighting and for motive purposes.

3. The distribution of power hydraulically.

4. The laying down of tramways, and the maintenance of a public service of cars.

5. The erection and letting of houses for the poorer classes.

6. The installation and working of telephone exchanges.*

The temptation to make profit is difficult to be resisted by local authorities, their Mayors and Town Councillors naturally desiring either to improve their city or borough or diminish the calls they are forced to make upon the inhabitants. Personally, I am all in favour of the municipality earning a fair profit from the business of the supply of essentials to its inhabitants. The question then arises as to the

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one—that water was a necessity of life, and that a good supply was essential to the sanitary welfare of the inhabitants.

* In some cases also the construction and maintenance of docks and canals, and the establishment and maintenance of testing-houses—as, for example, the 'Conditioning House' at Bradford, an institution which is self-supporting.

best manner of utilizing the profits so earned. Obviously, there are two methods of dealing with profits—(*a*) to merge profits from all undertakings into a general fund to go in reduction of the rates, and (*b*) to apply the profits of each undertaking to that undertaking. In regard to the first, several objections present themselves. The temptation to starve an enterprise in order to set aside a sum for reduction of rates would not act beneficially for the ratepayers. The mergence of the profits of the several enterprises into one fund obviously would not tend towards greater efficiency and economy in management, for it would detract from the stimulus to a manager of a department to know that loss incurred in his department would be made good from another source.

The ultimate disposal of the profits is an exceedingly difficult question to decide in an equitable manner as between consumers and the ordinary ratepayers, and also as between the present and future generations. At first it would seem that no better system could be devised than to utilize the profits in (*a*) amortizing the specific loan on each undertaking, and then (*b*) in reduction of its capital account. A town taking this course, it is obvious, could, as years went on, supply its electricity (for example) at a much lower rate than could towns where the profits had been absorbed in the reduction of rates, with the important advantage that the manufacturers of such town would be placed in

a very advantageous position in competing with the manufacturers of other towns. But in this case it could be fairly urged as inequitable to utilize the profits of one generation for the benefit of succeeding ones. Assuming that the rate of profit earned be kept low in the interests of consumers, perhaps the best mode of disposal of surplus profit would be to place it to the sinking fund of the municipal borrowings generally. In this relation one might add that it is the general practice of corporations to set aside a depreciation percentage quite inadequate for the proper upkeep of their plant and machinery.

The point I would wish to forcibly impress is, that in regard to municipal undertakings each department should be run and made to pay upon its own merits. The capital employed in it should be kept quite distinct, and its accounts should be audited annually by public auditors, in order, amongst other things, that direct and correct comparison could be drawn between the economical efficiency in working of one town with another. Over and above this, a report should be made each year by an expert as to the upkeep of the corporation plant and machinery employed in the undertaking, and the advice contained in such report, as to the advisability of the renewal and throwing out of obsolete plant, should be acted upon.

This, perhaps, is as much as can be said regarding profits. When we turn to the *scope* of municipal

undertakings, one is forced to admit that enterprise has not been tempered by discretion. It would take too long to go over the very wide ground already covered by municipal enterprise, as, for example, that the Corporation of Glasgow possesses stone-quarries and builds tram-cars, that some local authorities act the part of milkmen, some own race-courses—as, for example, Doncaster, Brighton, and Pontefract—others—Bournemouth, to wit—own golf-links; we even have corporation theatrical proprietors and music-hall managements—as, for example, Southport, Brighton, and Yarmouth.* The Glasgow Town Council even conducts a laundry business for the purpose of making a profit. That in connection with such undertakings considerable risk is involved needs not to be pointed out. Municipal pawnshops—which are now largely in vogue upon the Continent—although trading concerns, have the minimum risk, and therefore belong to another category. As an indication of the feeling in favour of municipal enterprise, recent demands are as interesting as they are comprehensive. The following powers have lately been sought for: 'By an Act of last year power was given to a Midland Corporation to provide Turkish baths. In a Bill of the recent session power was sought, among other things, to provide apparatus for games and athletics, to be used presumably, but not necessarily, on

* Yarmouth made a moderate profit on its Music Hall, but Brighton lost heavily upon its Aquarium.

recreation-grounds established by the authority. In another power was sought to provide Refrigerators and Cold Ice Stores for the preservation of marketable articles, and to sell ice. In another it was proposed to provide Bathing Tents. In another Tailoring was contemplated; Saddlery in another. In several power was asked for to construct and manage Refreshment Rooms in parks. By many corporations the power of manufacturing, as well as supplying, electrical fittings was demanded; and in three cases efforts were made to acquire the privilege of providing entertainments and charging for admission. These instances point to a very far-reaching attempt by municipalities to invade the provinces of individual enterprise — an attempt which needs very careful watching, and some authoritative pronouncement by Parliament of wider influence than the decision of particular committees.'*

Amongst the enterprises involving serious trade risks upon the part of municipalities which I view as utterly unjustifiable are the building of steam-engines, the construction of dynamo-electric machines, the manufacture of electric fittings, and the acquisition of patent rights. A mere casual contemplation of what this means by way of risk and the unwarrantable intrusion upon private enterprise impresses upon one the wisdom of the view taken by the *Edinburgh Review*, that '*some authoritative pro-*

* *Edinburgh Review.*

nouncement by Parliament of wider influence than the decision of particular committees,' is certainly called for.

If municipalities are to supply material entities, why not alimentary ones? Some claim the bakeries should be supplied by the municipalities. If the bakeries, why not the bread? If slaughter-houses, why not meat? Mr. J. Burns and the 'change-everything' genus of socialists will, we know, echo 'Why not?' But it is obvious to the sober-minded that the proper answer should be because individual enterprise—the psychic entity which has built up this nation and her colonies—must thereby, perforce, be starved into inanition.

I have referred to the merging of the *essential* with the *non*-essential in regard to entities; municipal bakeries, for instance, might logically lead up to Corporations becoming bakers, etc. A similar kind of difficulty as to drawing the line of demarcation presents itself in regard to the dealings of municipalities beyond their boundaries. A Corporation which may have had the enterprise to conduct water to its town from a source, it may be, hundreds of miles distant, if it be requested to supply smaller communities with the commodity in the acquisition of which it may have spent millions, may be rightly considered to be entitled to supply such to others at a profit. Here we find ourselves in a field far away from the axiomatic self-supply of necessities. Again, in the case of a large town with a powerful

electricity generating station, having the opportunity of supplying current to outlying districts and the towns of smaller communities in the neighbourhood, if the laying down of mains and the supply of current appeared to offer a remunerative trade, the question is, Who is to decide how far such ultra-urban and foreign supply is to be carried? Take another case: how far into and beyond its suburban boundary should a municipal tramway extend? This is a matter which may land a municipality into considerations and responsibilities of great moment far beyond its domain. For example, the Glasgow Corporation tramways are already working more than thirteen miles beyond the city boundary, and shortly this is to be extended to thirty-four miles. It is clear, therefore, that, unless some suitable check be applied, our town councillors will ere long find themselves in the position of a Board of Directors of a concern owning and controlling a network of tramways extending over an immense area, and their responsibilities in this respect will be not less onerous than those arising from the control of a railway system. The question to be considered is, Are the majority of town councillors fitted for such work? and if so, what advantage would the public gain from their fulfilling such duties in place of the directors of tramway companies sanctioned by Act of Parliament in the ordinary way?

A consequence of corporations entering upon municipal enterprises of various sorts has been that

in some instances they have been induced to play the part of the 'dog in the manger'—in other words, to boycott private enterprise in order to leave the ground free to be taken up by themselves at some future time. Again, in cases where the consent of a local authority is necessary to the grant of a provisional order or the introduction of a private Bill,* as in the case of electric lighting† or the laying down of tramways, local authorities have in not a few instances exercised their right of veto for the purpose of extorting from such private adventurers conditions of doubtful principle and equity. As things stand, municipalities are enabled to take over electric undertakings at an unfairly cheap rate. Great damage to private enterprise and retardation of progress in this country ensued from the clause in the provisional order Bill, limiting the conversion at first to twenty-one years, but subsequently to forty-two; but the most unjust feature is the power given to corporations to purchase on expiry without any payment in respect of goodwill.

From the foregoing I submit it is clearly evident that Parliament must make up its mind in regard to some limit.‡ For the powers sought to be acquired

* The former is by statute, the latter by standing order of Parliament.

† Under the Electric Lighting Act the assent of the local authority is a condition precedent to the grant of a provincial order; but the Board of Trade—the department granting the provincial order—can dispense with that consent. It occasionally does so.

‡ 'The unfavourable complexion of the revenue returns will

will naturally increase, not only in number, but in variety and unreasonableness. Precedents may become established which it may be difficult subsequently to resist. The policy of corporations and Town Councils of taking more and more of extraneous work upon their shoulders cannot be extended indefinitely with safety. We have to ask ourselves,

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have prepared the public for the somewhat depressing Budget forecast which the Chancellor of the Exchequer has shadowed forth. Unless some astonishing expansion of receipts occurs before March 31, there must be a deficit, and Mr. Austen Chamberlain, instead of remitting taxation, may even find himself compelled to increase its pressure. That untoward prospect is, at all events, sufficiently in sight to cause him some irritation when he reflects that there would have been a comfortable surplus had not Mr. Ritchie abolished the corn duty. That egregious blunder having, however, been committed, it is all the more incumbent on municipal authorities to suspend those constant borrowings which are draining the money-market, raising the rate of interest, and paralyzing industries working on narrow margins. In the decade between 1891 and 1901 the outstanding joint indebtedness of these governing bodies increased by nearly £100,000,000, the augmentation in the final year amounting to no less a sum than £23,000,000. *Rich as this kingdom has become, its monetary resources cannot bear such perpetual depletion without crippling national trade* to a more or less serious degree. Mr. Austen Chamberlain has entire justification, therefore, for calling on municipal borrowers to balance their local accounts by retrenchment in expenditure instead of by issuing fresh loans, as is their present practice. *But it will need some more effective force than argument to check their extravagant propensities. There ought to be, and there will have to be, some strict limit, proportioned to assessment valuations,* to the right now possessed, and so freely exercised in many cases, *to pile up debt upon debt without the least regard for the national interest.*'—Extract from the *Globe*, 1903.

'Who are the men to be the directors of these vast Civic Industrial Concerns?' They are our Town Councillors—unpaid men—who should not be looked to for the supply of an enormous variety of commodities. Nor could they carry out such work without both individual and national disadvantage—individually, by over-tasking their own powers; nationally, by injuriously interfering with the business of private traders and privately trading industrial corporations. Valuable as, and appreciated as, are the unpaid labours of the civic functionaries of the kingdom, it would be neither just nor wise to lay upon them unnecessary and unduly severe burdens. For it must be remembered that the majority of members of our Municipal Councils are men usually ripe in years—men either engaged in business or who have retired from it. It is regrettable that the proportion of wealthy men, with but moderate calls on their time, and men in the prime of life who devote themselves to local affairs is very small. Town Councillors, therefore, could give but limited time to such vast industrial work, as it is clear is in contemplation.

The more ominous aspect, however, is the undue interference with private enterprise. It must not be forgotten that the huge volume of commerce of this country—the largest in the world—has been built up almost entirely by private enterprise, and the skill and perseverance it has shown itself possessed of has overcome enormous difficulties. To

private enterprise has been due the prosperity of our Empire, and the welfare and comfort of its teeming inhabitants. The State has not actively aided in all this, and were it now to sanction great municipal monopolies in the supply of commodities where monopoly is *ex necessitate rei*, neither compulsory nor necessary, and thereby interfere with and oust private enterprise from important spheres of usefulness, it would be taking a retrograde step of momentous and baneful effect.

And here we ought to ask ourselves the question, 'Is there not something deeper underlying this powerfully expressed desire for wholesale municipalization?' I think I cannot do better by way of reply to this momentous question than to quote Major Leonard Darwin,* who has made such a deep study of the matter: 'Socialism and the desire for municipal trade are undoubtedly products of the same great political and social forces—the result, that is, of the increased power of the mass of the people, and of the great extension of the facilities for intercommunication of all kinds. Socialistic politicians are always keen advocates of municipal trade, and are naturally prepared to go to any length in this direction. Some hope, as regards all trades, to be able to organize them "on a public basis, one branch after another, transforming them into collective capital and socialistic labour." Others desire municipal enterprise more on account of its

* 'Municipal Trade.'

indirect effects. By paying municipal workmen better than their fellows in private employment, they hope to spread the belief—a belief they themselves probably honestly hold—that better conditions necessarily accompany State employment. It being, further, their intention to obtain, if possible, the control of the administration of our great cities, they not unreasonably argue that the greater the number of voters in the pay of the captured municipalities, the greater will be their chances of success in any struggle in favour of a more advanced socialistic system. Thus the advocates of municipal trade undoubtedly find themselves to this extent in alliance with socialistic politicians of an extreme type.'

How far others who may share the opinion I venture to put forward, *that municipal undertakings should be limited to the supply to their communities of absolute essentials*, are justified in standing aloof is a matter which must be left to them. How far the frustration of what might prove to be a nationally disastrous municipal reform will be brought about by consequent intolerable taxation the future must answer.

I have ventured to bring to the notice of the reader opinions and facts concerning monopolies and municipalities in the hope that organizers may reflect and with appropriate caution enter upon municipal enterprise in connection with Garden Cities.

GARDEN CITY BANKS.

I HAVE ventured to suggest, in my opening remarks, that anything in the nature of pure charity, if applied to Garden City development, would be highly inimical to its interests, humiliating to its inhabitants, and fatal to prospects of national benefit arising from the building of further towns upon the lines indicated and the general extension of the principles underlying the conception. I would even, from the above considerations, strongly deprecate any monetary gifts beyond those usual in other towns and communities, for the principle involved would inevitably lay the Cities under reproach that their establishment could not have been accomplished and their work carried on except with the assistance of such munificence and such gratuitous monetary aid.

But whilst here emphasizing my view, I cannot too strongly supplement it with my idea of the magnitude of the good to be derived from judicious *investment*, at predetermined low rates of interest, in undertakings having for their object the nursing

of new industries and the fostering of matters and men of weakly financial constitution.

I would, in place of munificent bounty, urge bold and strenuous 'help for self-help,' and if the helper to the self-helping shall, in aiding, reserve to himself a share of the profits as well as of the risks, he will have done a good thing, and a better than a charitable. He will have helped another without degrading him, he will have secured a partner instead of a dependant, he will become face to face with a man who can feel gratitude in his heart unaccompanied with the blush of humiliation upon his cheek. Who is there among us who has not lost a friend by 'temporary assistance,' who among us has not been stabbed to the heart by the stiletto of ingratitude thrust home by the erstwhile suppliant? How often, indeed, are we led to declare 'there is no such thing as gratitude in this world'! In everyday life charity, unhappily, can but rarely be placed upon the lofty pedestal with Shakespeare's mercy.

If, on the other hand, we join the 'self-helping' in helping themselves, our endeavour and energy is expended upon the *task*, and not upon the performer; thus the uncertainty and instability of human nature is largely eliminated, and success more frequently results. Moreover, should we err, we are in a position to retrieve much of the seed we have inadvertently thrown on polluted soil, to be sown in other better qualified to bring forth the looked-for fruits.

The admirable exhortation of Shakespeare—

> 'Neither a borrower nor a lender be;
> For loan oft loses both itself and friend;
> And borrowing dulls the edge of husbandry'—

is one which can, unhappily, be acted upon to but a very limited extent in the business of the twentieth century, for the most powerful brake to the wheels of progress is want of capital. It hangs ever in contact with the laboriously-trundled *tympana*, ever ready to grip them and to bring them a standstill—their energy dissipated in the friction of strife and the heat of useless endeavour.

We see this retardation taking place around us on every side; we frequently see how much good could be done by the application of another's shoulder to the wheel. The shoulder need not be a very powerful one, if only it be applied *at the right time* and in the *right manner*. Yet how often have we ourselves looked in vain for that helping shoulder.

If the friends of the Garden City movement be really in earnest in their desire that it shall provide means of emptying the alleys and by-lanes of the poorer districts of our overgrown towns, surely never was there a finer—nor more extensive—field of labour before them. Is there a single reader who knows not of some persevering, ever-toiling handicraftsman who would be materially helped if he could obtain some small capital to enable him to

extend his business by extending his modest plant and machinery to the extent requisite to employ one or two helpers, men of less status even than himself? If he be honest and trustworthy, help him, for you will at the same time be helping those of whom you speak and desire to assist.

Let us, then, consider what kind of machinery we have at hand in readiness for such work; but we look around only to find—none whatever. We have 'penny-banks' and such-like institutions founded to encourage thrift. Of their wise intentions, as well as their great and nationally important success, one cannot speak in terms too laudatory. In large towns we have, on the other hand, self-styled 'loan offices' run by usurers and thieves; we have, again, banks where the better-to-do may borrow upon security, or obtain overdrafts upon depositing deeds of real estate in their strong-rooms. But we in England may seek in vain for the bank which will lend the needy man of industry, the rising master-man, the temporarily embarrassed agriculturist, the wherewith to carry on his trade upon no more tangible security than that of his known integrity and good character. London, the metropolis of the world and the commercial hub of the universe, is singularly devoid of any financial machinery suited to the shifting of small burthens and the acceleration of small businesses. We seem to have no *bonâ fide* industrial banks such as would correspond with the *Crédits Mobiliers*

of the French, or the still more helping-hand *Darlehnskassen* credit systems of Germany and of Austria, and the *Luzzatti* credit of Italy.

London banks are, moreover, harder in their transactions of temporary accommodation, and far stricter in regard to the overdrafts of their customers. Many are the industrious and persevering mill-owners of Lancashire and Yorkshire—erstwhile mill-operatives—who can attribute their success and rise in the social scale to liberality upon the part of bankers of their town, who have been able to watch their progress and mode of life, and who have, time and time again, borne certain risk by permitting overdrafts in time of need—overdrafts repaid with fidelity and gratitude. The absorption of the older banks into shareholder concerns has recently much altered this.

If we ask ourselves, 'Is the average British working-man a thrifty individual?'—again, were we to inquire carefully into the inculcation and exercise of thrift in regard to our working population—which space entirely precludes—we should find the answers most unsatisfactory. We should find the constantly increasing rate of wage during the last half-century unaccompanied with anything like a proportionate rise in the rate of thrift. Indeed, albeit it is sad to have to make the statement, in regard to the majority of operatives the idea of saving appears never to enter their heads. The most noticeable effect of increase in wages—it is useless to blink the

fact—is the increase of expenditure upon *un*-necessaries of life, notably immoderate expenditure upon drink. The result being that, upon any trouble arising, even though it be of the most temporary duration, as, for example, the closing of a mill or factory, we *immediately* hear of 'thousands destitute.' This, unhappily, would still be the same were it possible to-morrow to *double* the rate of wage.

Although these are facts well known and deplored, yet perhaps it is not so generally known what immense sums our workers—despite their extravagant and wasteful mode of living and the rate of wage obtaining—are enabled to spend upon pleasure. This would indeed be gratifying were it tempered by moderation. Even as things are, they show a certain degree of wholesome progress, for by the establishment of holiday societies the workers have been enabled to annually put by sums to be spent by them at the seaside or elsewhere, so that nowadays—a thing assuredly beyond the range of the mental vision of their grandfathers—our operatives can take their couple of weeks' relaxation from toil in a manner quite comparable with the mode of others far above them in social *status*. This everybody must be pleased to know. Feeling that the matter is one not only of much interest, but one worthy of emulation, I have, by the courtesy of some of the Lancashire manufacturers, ascertained approximately how matters stand in this regard, and am enabled to lay them before the reader. Perhaps

in no town is the system more completely and carefully worked out than in Oldham. The following table gives approximately the rise in the amount of money put by for this purpose :

Year.	Amount.	Year.	Amount.
1886	£36,000	1895	£110,000
1887	40,000	1896	135,000
1888	35,000	1897	160,000
1889	40,000	1898	150,000
1890	45,000	1899	150,000
1891	60,000	1900	175,000
1892	80,000	1901	160,000
1893	72,000	1902	160,000
1894	73,000	1903	150,000

The deposits are made through the instrumentality of holiday clubs, locally known as ' Wakes ' clubs or ' Going-off ' clubs, and it will be seen that they undoubtedly constitute aids to thrift, seeing that the subscribers are entitled to withdraw the amounts of their deposits at any time, should necessity arise ; a fact accounting for seeming discrepancy in the gradual increment of the total amount deposited, such aberration being explained by withdrawals prior to the date of distribution or ' going away.' The number of these in the single town of which I am now speaking, and having a population of 131,463, is quite surprising. There existed, as I am informed, in 1902 no less than 169 of them, whilst the amount of holiday money paid out during the previous years had been :

Date.	Number of Clubs.	Amount.
1899	174	£103,283
1900	131	91,723
1901	160	96,293
1902	161	94,690

It may be stated roughly that the cotton operatives earn, for men, £2 a week, women £1, young persons from 15s. down to 7s. It would have been interesting had one been able to add the number of operatives participating in the deposits and subsequent holiday withdrawals; but it is impracticable to ascertain the number of men, women, and children who subscribe for various reasons, amongst them being the fact that frequently three or four children in one house are found to be subscribing for a couple or so of shares standing in the name of a single person upon the club books.

These holiday clubs are formed at Sunday-schools, workshops, and public-houses, mostly at the latter, and the subscriptions are continued for fifty weeks.

The rules governing them vary slightly in connection with the workers at different works, mills, and factories, but the following is roughly the modus: A secretary and treasurer is chosen among themselves; the shares are sixpenny shares, and each subscriber may take up as many as he or she may desire up to a limit of twenty, but must hold no more. The payments into the club commence to be made the week following the August holidays and continue for the fifty weeks. Any subscriber may borrow money from the club up to the amount individually paid in at interest. The funds of the club are deposited at interest, being usually paid into the bank in sums of not less than £10 at a time, and the subscriber withdraws his deposits at the

expiration of the fifty weeks, the amount being at the rate of 25s. per share *plus* interest accrued, which has varied from 8d. to 1s. 2d. per share.

The delighted operative and his more than delighted family are now in a position to relax from their labours and give themselves up to pleasure, a pleasant enough picture for us to contemplate. But this brings us to the lesser satisfactory side of the matter. These operatives, in subscribing to these clubs, do not do so in the spirit of 'thrift': it is done with one set object, that of pleasure. To this one can offer no objection; it is right and fit that if they have laid by for such a commendable and health-imparting object, they are justly entitled to use their saving in fulfilment of that specific object. But, unfortunately, the spirit of utter disdain for anything in the nature of thrift or laying by for old age is evinced by the deplorable fact that at the expiration of their days of delight they wilfully squander any balance they may have of such savings by petty squanderings and excesses, such as 'standing treats' to perfect strangers, with the sole object of emptying their pockets until they shall contain nothing but the return half of their excursion ticket. Thus, on recommencing work, they find themselves indigent, and wholly unprepared to meet any emergency which might arise.

Now, when one glances at the magnitude of the figures here quoted, one cannot but experience a feeling of regret that means for the inculcation of

the immense value—moral as well as practical—of thrift cannot be brought well to bear in dealing with such vast and unwieldy communities; it, moreover, makes us reflect how far more efficaciously such matters could be handled in smaller communities, such as those the inhabitants of Garden Cities would constitute. If, for example, these mill operatives, having the advantage of fixture of locality in regard to their abode, could be induced to invest such surplus in such means of acquisition of their own dwellings as those to which I have elsewhere referred, it is at once seen with what facilities the father of a family, all the units of which beneath his roof are wage earners with aggregated earnings of no less than £4 10s. per week—equivalent to an income of £200 a year after allowing for rent—as I have shown, could become the freeholder of his dwelling, and thus be able to live rent free in the evening of his days.

Such considerations as these, so potent for the welfare of the worker, and in the aggregate of such vast national importance, show us at once both the value and the *need* of inculcation of the spirit of thrift, and must be my apology for mentioning the matter. Thrift-encouraging institutions for the benefit of the wage-earning classes were inaugurated so long ago as 1799, when the Rev. Joseph Smith and two parishioners of Wendover offered to receive any sum, from twopence upwards, every Sunday evening during the summer months, and to repay at

Christmas to each individual the amount of his deposit, with one-third of the sum added as a bounty upon economy. To this action, and that of Miss Priscilla Wakefield in stimulating the frugality of the poor children of Tottenham, the origin of savings banks may be traced, although the liberal interest allowed by these good people, which was at least 67 per cent., transforms their work into philanthropy. Later on Miss Wakefield extended her plan so as to include labourers and servants, by starting the Charitable Bank at Tottenham. Six gentlemen acted as trustees, undertaking to allow interest at 5 per cent. But this, the earliest instance in England of a savings bank based on principles now existing, involved loss. In 1808, a charitable savings bank, allowing 4 per cent. interest, was started at Bath by several ladies for domestic servants. The savings-bank system, entirely independent of charity or patronage, dates, however, from 1810, when the self-supporting and properly-organized Parish Bank Friendly Society was founded by the Rev. Henry Duncan at Ruthwell, a poor district in Dumfriesshire, where wages for land labour averaged eight shillings a week. In four years the deposits amounted to £1,000, and the success produced many imitators in England and in other districts of Scotland. Thus was the snowball inducement to thrift set rolling. Six years afterwards, the number of savings banks having reached nearly eighty in England and Ireland, legislation became necessary, and in 1817

two Acts for the encouragement and regulation of banks for savings were passed. In accordance with the provisions of these enactments, the trustees of savings banks were prohibited from making profit, and were compelled to remit all funds over £50 to the National Debt Commissioners, who allowed a yearly interest of £4 11s. 3d. per cent. Four per cent. was the rate given by most of the savings banks, so that, taking into consideration the limited turnover, the margin was probably just enough to defray working expenses. By the limitation of deposits in any one year to £50, savings banks were restricted to the classes for whom they were primarily intended, and competition with the ordinary banks was kept down. The altered circumstances resulted in the establishment, within a year, of 227 banks, with aggregate deposits of £2,915,000, in England and Wales, and about as many in Scotland and Ireland.

That the national savings-bank system has done good work incalculable, needs not to be written. But that in no way diminishes, but rather emphasizes, the necessity of thrift-encouraging devices, for it must be remembered that, according to the views of the Savings Bank Committee, the State holds the deposits simply as a banker, and not as a trustee for the promotion of thrift, and that the working of our savings-bank system entails loss (amounting, since the passing of the Act (1877), to £617,330, and estimated to amount during the next six years to

£1,864,563), a loss which has to be made good by taxpayers, so that the encouragement of individual thrift amounts to realization of national thrift.

It is unfortunate that I should again have to turn to the Continent for an example of what might be with us, but this time one is somewhat relieved by the fact that in the Sister Isle the advantages of the continental system have already been secured for the struggling peasant and the needy agriculturist. These banks, for the advance of moderate sums of money without deposited security, were first instituted by Herr Raiffeisen in Germany in 1849 for assisting in agriculture, and hence upon their introduction into Ireland were called 'Rural' Banks.

When one reflects upon the splendid results achieved from the scheme devised by Raiffeisen out of his own great needs and those of his time, it is indeed interesting to call to mind that they were developed through the perseverance and wisdom of a single man, and he a poor and delicate burgomaster. He resided in Flammersfeld, in the Westerwald, and was moved by the misery and want of capital among the surrounding peasantry, by the exorbitant usury exacted by private money-lenders, and by the entire lack of a co-operative spirit among the peasants. Raiffeisen formulated no big scheme, but commenced by working out his ideas in his own little village. He at first succeeded in uniting some of the better class of the peasantry into a 'Co-

operative Bakery,' and brought down the price of bread to one-half; the following year he formed a co-operative 'cattle-buying society,' and in the same year (1849), with £300 which he had raised, he formed his first 'Loan Society.'

This famous little bank of Flammersfeld had, a few years ago, a reserve of £2,000. At first progress was slow, but Raiffeisen quietly worked on. A second bank was formed in 1854 at Heddesdorf, near Neuwied, and since 1879 the progress has been rapid. In 1885 there were 600 of these banks in existence; five years later there were 1,730, whilst in 1896 there were no less than 2,169. Later figures show still further increase in these helping-hand credit devices. In 1888 the founder of the movement passed away, having had the inestimable satisfaction of seeing the result of many of the countless benefits he had conferred, outcome of his humble efforts—a privilege denied to many benefactors of their race.

One of the greatest needs of the farmer is cheap credit. He generally gets his profit from his work at one period of the year; and unless he has money already in his possession he must, for a considerable time, buy on credit or borrow money to pay for his seeds, manures, cattle, etc. His rent is often due at a time when the sale of his stock would mean a certain loss, and if he could obtain money to hold it over for a couple of months he could effect a better sale. There are numberless improvements,

certain to repay their cost, which could be made on his holding, such as a drain or a shed; or the opportunity for a cheap purchase of pigs, sheep, or cattle often will present itself if cash could only be had at the moment.

The advantages of being able to obtain money easily and at a low rate of interest are evident. The Irish equivalent to the English 'loan office' is the 'Gombeen' man, who is the curse of many a parish. The assistance of the 'Gombeen' may be commanded generally on terms of 10 per cent. interest, the amount of interest to be deducted beforehand; for example, on a loan of four pounds he will deduct four shillings beforehand for interest, and the repayment begins the following week at the rate of four shillings a week, with a fine of sixpence a pound for every week an instalment is not duly paid. The interest on the money actually in the borrower's possession, which is ever lessening in amount, is about 30 per cent. To apply to the much-advertised 'loan offices' for money and to deal with them generally means ruin.

Localities where money is scarce and could be usefully applied, and where the conditions of borrowing are those such as I describe, are where such Banks are instituted, but there is no reason whatever why Garden Cities should not have such; on the contrary, they would be able to perform most valuable work. The application of the principle of co-operation to credit is identical with its application

to other branches of industry. A number of people join together to obtain advantages as a body which they cannot obtain by acting separately. By forming themselves into a society they can, on their joint unlimited engagement to be responsible for the liabilities of the association, get money enough for their needs. This they can lend again to each other at a slightly higher rate of interest. The difference between the interest paid and the interest received will pay expenses, and help to form a reserve fund. It has generally been found possible to borrow money at from 4 to 5 per cent., and to lend it at 6 per cent. As the bank gets better known it is able to borrow and lend on still easier terms. Wherever such societies have been at work for a little time, it is found that usury disappears from the neighbourhood. As in the case of dairies, each member has one vote only. He assists in the management, and has a voice in the election of the officials, the committee, the secretary, and the treasurer. The duties of the committee are to admit members, grant loans, and fix the rates of interest for borrowers and depositors.

As one of the greatest securities such a Bank can offer to outsiders is the good character of its members, no one can be admitted whose honesty, thrift, and good character are not well known. No improvident person is admitted. To enable the committee to judge upon this accurately, the area of a Bank's operations is confined to a parish or

to a district, where any possible applicant for membership and his social standing are known to them. Obviously, Garden Cities would stand at an advantage in this latter respect. An entrance-fee of sixpence is charged to cover the initial expenses.

It is required of every applicant for a loan that he or she must state what is proposed to be done with the money, and the term for which it is required. The length of time will be determined by the purpose. Money is never lent unless for profitable or productive purposes, or to effect some economy. The borrower must enter into a bond to apply the loan to the purpose for which it is granted, and he must convince the Bank that he will be able to repay it out of the profits of his loan. But whenever money is lent, the Bank will accept the borrower's own conditions as to time or method of repayment. If, for example, he buys young pigs early in the year, he will want time to fatten them, and it is not fair to ask him to repay before he has made his profit out of his loan. If he repays by instalments, the interest is charged only on the money actually in the borrower's possession at any time. For instance, if a member borrows £5 and repays £1 a month, the interest will be charged only on the full amount for one month, on £4 for two months, on £3 for three months, on £2 for four months, and for the full time only on the last pound. The interest is not deducted beforehand, but is payable with the last instalment of

loan. It is usually charged at the rate of one penny and one-fifth per pound for each month.

The Bank will receive deposits of savings from its members, and allow them interest at the rate of 4 per cent. That is more than the Post Office Savings Bank allows. The security offered is the joint unlimited engagement of members to be responsible for the debts of the society. These members are the depositors' own neighbours, chosen for their good character and honesty. The depositor has always the money in view, for he can examine the monthly statements and see how the Bank stands. The accounts are audited by a public auditor yearly. By putting his savings into the Bank a member is helping his neighbours. He keeps the money of the district in the district, where it is always in circulation, doing good and producing more money. It is perfectly safe. The faith that is built upon such a foundation of honest men banded together is built upon a rock.

The Raiffeisen system of co-operative credit successfully dealt with a state of things in Germany rivalling those of our country and her sister. So great indeed has been the success that there are now more than two thousand of these credit societies in operation in Germany, and these are in a position to boast that *after forty-six years of experience, no one, either member or creditor, has lost by a single penny.* The testimony to their value comes from all quarters—from distinguished economists, from

priest and pastor, as well as from the members themselves. 'Homes have been made habitable and comfortable; culture has been improved; machinery has been purchased and the best feeding-stuffs; the small peasant can now buy his implements and manures of the best qualities at the cheapest wholesale prices; the usurer has been driven out of the field.'

All this has been accomplished by cheap credit. The system has been adopted for Ireland, and pioneer banks started, whose sound financial condition after some years' working and whose beneficial action justifies the extension of similar Banks on both sides of the Irish Channel. Although their introduction is so recent, their success in Ireland, and the good work already effected, is most gratifying, for—as Sir Horace Plunkett informs me—up to the end of 1903 no less than 201 of these Banks had been established, representing a membership of nearly *eight thousand* (7,917), whilst the number of loans had reached over *twenty thousand* (20,202); 3,722 loans being granted in 1903, to the value of £20,435 16s. 4d.

Here, then, is a golden opportunity for rendering help as I have suggested by *investment* at predetermined and low rate of interest. Let the well-wisher withdraw some of his or her investment from the lap of 'the old lady in Threadneedle Street,' who holds it safely at about 2½ per cent., and invest it in Class A cumulative shares bearing

interest at 3 per cent. in Garden City Co-operative Banks.

Nay, let her do more! let her bring to the notice of the committee the honest but needy seamstress of the urban attic, anæmic and jaded, and let her be 'set up in a business' in a Garden City; the rheumatically crippled newsvendor of the street-corner, and let her be set up in a nicely-warmed kiosk; the widowed stationer of the slum, and let her have her little shop near the Technical College, where her children would be taught to cultivate flowers they had erstwhile hardly ever seen.

THE DISPOSAL OF THE DEAD.

LIFE must cease in Garden Cities as elsewhere—although there is every reason to feel that their amenities will be highly conducive to longevity—and the question will, of course, be asked, should any special arrangements be made in this relation? The question of cremation *versus* earth burial has of late years received far more consideration than formerly, and during later years crematoria have been established. Looked at from the purely sanitarian point of view, cremation is undoubtedly the most perfect system of the disposal of the dead. The matter is one calling for the most serious consideration on the part of the hygienist, who, it need scarcely be mentioned, must cast sentiment aside, and—reasoning alone by the science of his avocation—he can but arrive at the conclusion mentioned.

As against the crematory process, however, it has been urged that there exist serious medico-legal objections, chiefly in regard to the fact that complete resolution of the body carries away with it all trace of abnormal conditions which may have attended death; also the possibility of exhumation.

On the other hand, it is clear that the factor involved is merely one of time. Hygienist and sanitarian would have us take steps to expedite the resolution of the bodies of the dead in the interests of the living, and it is obvious that the maximum of efficiency can only be attained with minimum of delay. But just in proportion as sanitary requirements become fulfilled and the time is diminished, so is the value of the medico-legal objection increased. The matter, therefore, becomes transferred immediately to the sphere of *logical* reasoning. Whether it be better to make provision for an eventuality—to occur at most as one case in a million of the dead, whereby the safety is impaired of millions of the living—or whether it were not more rational to provide the utmost that science can provide for the health and welfare of the living, even at the risk of one evildoer, to millions of the innocent, going unpunished. Surely, moreover, it were both more logically as well as more scientifically correct to strive to find means of scientific confirmation of the cause of death *before* rather than after interment.

Whether it be due to revulsion of sentiment, or to an amplification of unselfish motive to benefit generally the inhabitants of our country, cannot be said; certain, however, it is that during the last decade great advance has been made in the practice of cremation. The first crematorium to be estab-

lished in England was erected at Woking, and was opened in 1885. This was brought about upon the recommendation of some of our ablest physicians and—most eminent—hygienists, prominent among them being the now venerable Sir Henry Thompson. In it have been cremated some 2,500 bodies, the yearly average having now grown to 300. Crematoria have since been established at Golder's Green, London, at Liverpool, at Manchester, at Hull, and at Darlington, whilst one is now in course of erection at Ilford.

When one reflects that our population is now increasing at the extraordinary rate of 12 per cent. per annum (12·17 per cent. during the last census decade); that all our ancient churchyards now form resting-places to their full capacity; that the acreage for burial-grounds is year by year increasing in direct ratio to the increase of population, and that *ex necessitate rei* any undesirable effect or unsanitary influence arising must also be augmented in like proportion—then it is clear that, even if sentiment be involved, we should strive to quench such feeling in the interests of the welfare of the millions.

It is not, however, by any means proven that public sentiment is adverse to cremation. Until such time as crematoria existed it was impossible to gauge public opinion in this regard, but since a few of these have become available the rapid

increase in the resort to this mode of disposal of the dead would quite point to the fact that public opinion is largely in favour of the system, from which the assumption is justifiable that sentiment also trends in this direction.

Speaking a quarter of a century past, and feeling that sentiment and the natural tendencies of the people have led them to the earth, as the most fitting resting-place into which, when lifeless, they should be drawn, the accomplished hygienist proposed that in his City of Hygeia the cemetery should hold place, but in a form much modified from the ordinary cemetery, his object being to greatly expedite the resolution of the body. For this purpose the burial-ground was to be artificially made up of a fine carboniferous earth and cultivated with vegetation of rapid growth. The dead were to be placed in the earth from the bier, either in basket-work or simple shroud. What, then, would be the conditions presented to us by the rational mode he advocated, one intended to effect a sanitary amelioration of things obtaining to-day? Obviously, the conditions lead solely to the effect of *expedited resolution.* This is but a slight amelioration of the medico-legal objection, for, as he pointed out, in a few months no monument would indicate the remains of the dead. 'In that rapidly-resolving soil the transformation of dust into dust is too perfect to leave a trace of residuum.' This being

the case, the compromise is but of meagre efficiency. Such a compromise, moreover, carries with it the further objection that, under ordinary conditions, the earth is still defiled.

It might be urged that this, being a perfectly natural process, *must* be right. To this, of course, ready assent must be given *on condition* that the process be allowed to take place in a *perfectly natural* way. A moment's reflection, however, will serve to show that the natural process and the natural conditions are *not* complied with.

Nature most distinctly points out and daily provides us with object-lessons in this regard, that on any of her wondrous organisms becoming lifeless they are—and should be invariably—recommitted to earth *without delay*. We, perhaps, forget that animal and insectorial demise is taking place in our midst every minute—nay, *every second*—of the day and night. Yet we do not find the earth bestrewn with insectorial corses, though we know it to be teeming with its insect myriads, both alive and defunct. So important is this matter that Nature herself maintains also myriads of speechless *sextons*, whose duty, throughout their short lives, is to bury the dead. But, and this we must carefully mark, they do *not*, for this purpose, construct collective cemeteries—specific spots of land to be filled with lifeless and decaying organisms, in volume out of all proportion to the transmutable

capacity of the soil—wondrous though the work performed in the chemical laboratory of Nature is. If in cycling down a country lane our tyre should deal instant and painless death to any insect, from the smallest to the bravely antennæd stag-beetle, if we cared to wait and observe the effect, we should be astonished by the rapidity with which the sextons would quietly emerge from fosse and hedgerow, and solemnly drag away—to an isolated spot—their fallen comrade, there to inter him beneath a covering of earth capable of dealing with all gases evolved during decomposition.

With collective burial, however, such hygienic conditions are not complied with. Hence we find Richardson having recourse to a special carbonaceous soil, the great gas-occluding capabilities of which are well known. In this relation he put forward, in his arguments *pro* and *con* relating to cremation, a rather surprising theory—coming from a scientist of his attainments—to the effect that the crematorium, whilst being the most sanitarily perfect, left something to be desired in regard to the fulfilment of the complete cycle of Nature, for he was of opinion that 'by the complete resolution of the body into its elementary and inodorous gases in the cremation furnace that intervening chemical link between the organic and inorganic worlds—the ammonia—is destroyed, and the economy of Nature dangerously disturbed.' It is difficult to

judge what the learned physician had uppermost in his mind at the moment of making this assertion, which, reasoning *generally*, is scientifically incorrect, for it would not be precisely in accord either with known chemical transmutation or with the law of the conservation of energy.

I venture to suggest, however, that the doctor, at the moment, was not quite reasoning upon general grounds, but was biassed by local considerations, for it must be borne in mind that his City of 'Hygeia' was to be built upon the sea-coast, and there the *immediate* effect, under certain conditions, might be that an aberration—or it were more proper to say an *attenuation*—of the cycle might take place; for obviously the ammoniacal gases might be wafted out to sea.

Under usual conditions, obtaining in regard to cremation, of course, the resultants of the complete resolution of the body—its elementary and inodorous gases—are returned to the earth through the instrumentality of rain and dew. Nothing could be more absorbent of these gases than water, and this, in exquisitely gentle and kindly fashion, gives back to vegetation and to the earth, in ethereal form, the elemental solids which had been previously and temporarily borrowed from them to build up the transitory form of our wondrous bodies.*

* In this relation it may be interesting to draw the reader's attention to the fact, mentioned in these pages, that we are now

Thus, then, we learn the dictates of science, as of hygiene, are that the resolution of our bodies should be rapid, that our remains should be re-

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commencing to recover in considerable quantity, during the manufacture of 'producer' gas, the ammonia contained in coal. In other words, we are now placing back upon the land the ammonia contained in the vegetation which grew upon the land of past ages. One, indeed, might go farther and say that by this means we are replacing upon our earth this constituent of the bodies of our long since passed away progenitors. In this connection the following calculation is interesting: I have elsewhere mentioned (Chapter IX.) that the 'First Garden City' should be equipped with a gas-producer upon that system in which, during the destructive distillation of coal, the ammonia resident in it—the vegetation of prehistoric ages—is recovered. The plant erected in Garden City at the commencement will probably be the smallest one made—namely, that capable of dealing, by distillation, with 30 tons of coal per day. Let us calculate what proportion the ammonia thus recovered will bear to the annual mortality of Great Britain. The number of bodies recommitted each year is over *five hundred and fifty thousand.* Of these (1901) 367,724 are adults and 183,861 children. An adult corpse will return to earth 4½ pounds of ammonia, a child 3 pounds; therefore the temporary gain to the earth in 1901 was 2,206,341 pounds, or 9,699 tons. Weight for weight, the human body returns in ammonia to the earth about three times as much as coal. Each ton of slack (coal) yielding 23·18 pounds of ammonia, it would require the distillation of 95,614 tons of coal to give back to the earth the same quantity of ammonia as that derived from the mortality of the year 1901. Now, the 30-ton plant I have referred to, working 313 days in the year, would yield 21,033,600 pounds of ammonia, or 9,390 tons. Hence it follows that ten small Garden Cities—or even one large industrially occupied one—would be capable of returning

committed to earth in fact, not merely in form. It must be left to individual sentiment to decide which is the more pleasing reflection for our minds to entertain, as we stand beside the mortuaric slab, that the one recorded thereon, *quâ suo corpore*, has in truth 'passed away,' or, that that person, *qua corpus sine pectore*—perhaps the nearest and dearest to our heart—still lies beneath our feet in hideous, sluggish, attenuated transmutation. The whole matter, as I have ventured to suggest, resolves itself into relative speed of resolution. We know the disadvantages and dangers of delay; we should ask ourselves, 'Is any good purpose fulfilled by our artifices for the attenuation of a necessary and natural function?'

In other words, individual sentiment must decide which is the more preferable—the chill attributes of the cemetery, its drear and dismal reiteration of the passing hence, and its sanitary imperfection, or those of the crematory mausoleum, with its more cheering sanctity, its perfect hygiene, and its capabilities both in regard to architectural and sculptural effect as a fitting collective monument to those who have passed away. Surely such an

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to the earth the equivalent of all the burials taking place at the present time, and thus doubling the gain from that source. (For the physiological data requisite for this calculation I am indebted to Dr. Moon, Hon. Sec. of the Health (Advisory) Committee of the Garden City Association.)

edifice, rearing itself in lithic majesty in sculptured virgin whiteness, from a *campo santo* undefiled, verdured and relieved by Nature's own floral embellishment, with its chaste arcadings and loggia, their pillars rising from flower-beds to relieve the sombrous solemnity of the array of monumental mementoes upon the walls and the beauteous sculptured groups beneath the lengthy porticoes, there protected from frost and rain, is preferable to a vast flesh-chilling cemetery, thick studded with stony slabs, inornate and severe.

Here we have two methods of effecting one and the same end—a dual end—the disposal of the dead and the erection of mementoes to them, the natural cycle in due course—by that entrancing transcendental metempsychosis — obliterating all trace of the exanimate individual, the animate scions seeking to perpetuate the fled—the one the more scientifically perfect, the other more perfectly satisfying popular sentiment. *Both*, therefore, should obtain, in order to fulfil the present-day requirements.

But in relation to the latter and more ancient mode, the errors of the past should not be also perpetuated; huge cemeteries should be avoided, as also should burial in the immediate precincts of churches. Needless to add, burial in the crypts of places of public worship should be absolutely pro-

hibited, and with it all intermural burial.* The village churchyard—the silent, sacred 'God's-acre' —is redolent of solemn sanctity, of sad and pensive sentiment, but it is fraught with danger to the living. The tender solicitude, the affectionate tending expended upon its surface, cannot mitigate the processes beneath :

> 'Strew upon my dismal grave
> Such offerings as you have—
> Forsaken cypresse and yewe;
> For kinder flowers can take no birth
> Or growth from such unhappy earth.'

Requiescat in pace. Surely these solemn words merit due respect, not only as to our bodies, but as to our bones. That his bones should be disturbed is repugnant to the feelings of the Briton; it is not so everywhere, for even in regard to interment the practical, as opposed to the sentimental, side of character manifests itself. We find, for example,

* It may be interesting to note that intermural burial was totally prohibited at the time of the rebuilding of London. Yet it gradually crept in. Only a few years ago an order had to be obtained to exhume and otherwise dispose of the bodies contained in the crypt of the most centrally situated church in the City, so revoltingly offensive and so dangerous to public health had the effects become. The ancient ordination ran : 'The churches to be designed according to the best Forms, for Capacity and Hearing, adorned with useful Porticos, and lofty ornamental Towers and Steeples, in the greater Parishes. All Church-yards, Gardens, and unnecessary Vacuities; and all Trades that use great Fires, or yield noisome Smells, to be placed out of Town.'

the devout Swiss reverentially consigning the mortal remains to earth, yet not allowing the bones to remain there in peace indefinitely; for the Switzer considers the surface of his dear land too valuable to be o'erspread to any extent with the remains of his forefathers. He therefore, after the lapse of a certain time—never in any case exceeding thirty years—digs up the bones and stacks them in bins around his subterranean—and sometimes above-ground—chapels and churches. A grim sight indeed it is, whilst attending service in such an underground chapel, to see around the living the bones of hundreds of those who have passed away ranged tier upon tier in open bins around the walls, their skulls grinning out towards us whilst resting upon their thigh-bones.*

In no country in the world is such tender respect shown to the graves of the departed as in our own; in no country upon the face of the globe is there to be found anything approaching the soft, sad picturesqueness of our own village churchyards. Contrast, for example, the burial-grounds of the Switzer—his fraction of a God's-acre around his plain, cold, white church—with the restful beauty of a Surrey or Sussex churchyard. The tell-tale mounds swathed in soft sward, and all so orderly, so tranquilly spread out 'neath the outspreading oak and the sombre, deep-shade-casting ilex. There

* 'Across the Great St. Bernard.'

may one sit and pensively meditate; there, when the battle of life is o'er for those that now repose at hand, may *we* fittingly consider the conduct of our own, contrasting, perhaps, so harshly with the silent restfulness of the sacred spot.

What comfortless, barren, and white-walled little places are the former, with their harsh, acute, and rusted iron crosses! No clean white tombstones telling of recent bereavement, no lichen-grown ones speaking of revered and aged memory. Where is the soft green grass, the neatly-tended flowers, of the English village churchyard, where the sombre, dark-leaved ivy, creeping slowly to cover the fresh-turned, flesh-chilling clay, where the aged oak softly shading, the graceful willow, silently weeping o'er all? Where the soft velvet moss, inviting us to recline and to reflect upon the verdant coverlet—the pall which covers all? Restful mosses, meek creatures! 'the first mercy of the earth, veiling with hushed softness—creatures full of pity, covering with strange and tender honour—laying quiet finger on the trembling stones to teach them *rest*.' When all other service is vain, from plant and tree, the soft mosses and gray lichen take up their watch by the headstone. The woods, the blossoms, the gift-bearing grasses, have done their parts for a time, but these do service for ever. Trees for the builder's yard, flowers for the bride's chamber, corn for the granary, *moss* for the *grave*.

APPENDIX I. TO CHAPTER V.

NOTES ON EDUCATION AT HOME AND ABROAD.

To study the important question of education in order to be able to draw analogies and make comparison of the efficiency of various systems involves long and laborious research, and this into documents and official reports not readily accessible to the ordinary reader. I have, therefore, felt that something in the nature of synopsis and general comment might be found of some service. Justification for touching upon such a technical subject is to be found not only in the fact of its immense—nay, vital—national importance, but that our system is felt not to be satisfactory even by the administrators themselves. A very able article by Mr. M. E. Sadler, of H.M. Education Department, on 'Unrest in Secondary Education in Germany and Elsewhere,' published as lately as 1902, might be cited in support of this whilst suggestions for urgently called for reform by eminent educationalists have been mentioned in the foregoing pages.

England.

In England, according to Mr. Sadler, we have a very inadequate provision for first-rate intellectual instruction in cheap and easily accessible secondary day-schools, whilst much of the intellectual work prescribed for boys at our great public schools is inconsonant with our present needs. We have, moreover, very insufficient provision for the higher forms of technical, scientific, and professional training skilfully and appropriately adjusted to the more recent requirements of our modern life, or to what are likely to become urgent needs within the lifetime of the rising generation. In such matters—as, for example, in the professional training of teachers for secondary schools of

the older English type—we seem inclined to pride ourselves on 'not doing things *too soon*,' and to find excuses for *laissez-faire*, our unwillingness to look ahead, and our neglect to make practical provision for the requirements of the future. Lastly, though of much importance, we have, due to comparative neglect by us of national education for the better part of a century, in some respects a less enlightened public opinion to appeal to than have some of our rivals. As a nation we are much less intelligently interested than the Germans in methods of instruction, in the choice of curricula, and in the direct application of the results of scientific study to the organization of industry, to the development of commerce, and to the administration of public affairs.

With these premises in mind, it may be well to consider what is best in some of the Continental systems, to observe where they are leading, and to inquire whether they be adaptable to the needs of our own country.

France.

Taking first the primary schools, we shall see that we have something to learn from France. There, especially in towns, the little scholars of these schools start from their very earliest years. Kindergarten schools for children from two to six years of age, originally established by religious orders or private charities, have now been taken up by the municipalities. These are free; and the children, for a payment of about 1½d. a day, may receive their meals, whilst in the case of the very poor these are obtainable *gratis*. From March to November these schools are open from 7 a.m. to 7 p.m.; in other months from 8 a.m. to 6 p.m. The lessons are few, solely upon the Kindergarten system, and the children learn little more than orderliness, cleanliness, and politeness. At six years of age the child goes to the Public Elementary School; there he must remain until fourteen, unless after the eleventh year he may be diligent enough to obtain the certificate of primary instruction, which carries with it permission to leave school.

But education, even for the poorest, does not stop here, for in

every district there is to be found a Primary School having a complementary course of one year: this the child may attend; and also a Higher Primary school, having a distinct three years' course. The objects of the Higher Primary school are thus set out:

(*a*) The continuation and completion of subjects.
(*b*) Practical acquaintance with such branches of knowledge, literary, scientific, and general, as bear directly on the after occupations.
(*c*) General hand and eye training; such workshop practice as will engender habits of manual industry, increase dexterity, and develop taste. Or—
(*d*) In place of *b* and *c*, *a thorough technical training in one of the industries of the district.*

The Higher Primary Schools are free to day scholars. They are availed of by the children of the better-paid manual workers and the *petit-bourgeois.* These are district schools, and admission can only be gained by the possession of the leaving certificate of the primary school. To many of them boarding-houses, kept either by the municipality or by the married teachers, are attached, the fees for boarders varying from £18 to £25 per annum. The first year's course is general, and at the end of this the scholars choose one of the three following courses: (*a*) industrial, (*b*) commercial, or (*c*) agricultural. Instruction in these courses extends over two years, and at the expiration a higher leaving certificate is gained by examination. At the end of any year, should the scholar not reach the standard set out—through idleness or total ineptitude—the headmaster simply advises the parents to withdraw the child; should he fail, otherwise, to satisfy the requirements, he may be made to *redoubler*—*i.e.*, go back for a further year over the same course. The curriculum is varied and elastic, whilst inspection is only to see that the general directions are adhered to. The State pays the teachers' salaries, and these are fixed by the years of service, not by the rank of the teacher or the size of the school. There is no payment by results, that system which has stultified all our efforts in elementary education in this country, where subjects are chosen to be taught, not because they are suitable to the district, but because they earn a few pence more grant than others. Every teacher has to be trained, and it is the certainty of their position, as well as the social *status* attaching to it, which

attracts a much superior class of teachers to French elementary schools than the pay would warrant.

A great point in the French elementary schools, both Primary and Higher Primary, is the attention given to horticulture and agriculture. Every country school-house has its garden, and this garden is generally made an experimental plot for the teaching of the children.

Appended are tables for both boys and girls of the division of time suggested by the Minister of Education for Higher Primary schools.

HIGHER PRIMARY SCHOOLS, FRANCE.

TIME-TABLE FOR BOYS.

Subjects.	General Course.*			Industrial Course.		Commercial Course.		Agricultural Course.	
	1.	2.	3.	2	3.	2.	3.	2.	3.
Morals	1	1	1	1	1	1	1	1	1
French	5	5	4	2	2	2	2	2	2
Writing	1	1	1	1	1	1	1	1	1
History and Citizen Instruction	1	1	2	1	1	1	1	1	1
Geography	1	1	1	1	1	2	2	1	1
Modern Languages ...	3	3	2	—	—	4	4	—	—
Mathematics	4	3	3	3	3	2	2	2	2
Book-keeping	—	1	1	2	2	3	3	1	1
Natural History and Hygiene	1	1	1	1	1	1	1	2	2
Physics and Chemistry	2	2	2	2	2	2	2	2	2
Political Economy ...	—	—	1	—	1	—	1	—	1
Agriculture and Horticulture	1	1	1	—	—	—	—	3	3
Drawing and Modelling	3	3	3	4½	4½	1½	1½	1½	1½
Manual Work	4	4	4	6	6	2	2	6	6
Gymnastics	2	2	2	2	2	2	2	2	2
Singing	1	1	1	1	1	1	1	1	1
Special Time, according to requirements of the district	—	—	—	2½	1½	4½	3½	3½	2½
Total hours per week	30	30	30	30	30	30	30	30	30

* Note the first year's course is the same for all, the second and third year only varying. Careful study will show wherein the French consider differentiation requisite in the training in different occupations.

TIME-TABLE FOR GIRLS.

Subjects.	General Course.			Commercial Course.		Industrial Course.	
	1.	2.	3.	1.	2.	1.	2.
Morals	1	1	1	1	1	1	1
French	5	5	4	2	2	2	2
Writing	1	1	1	1	1	1	1
History and Citizen Instruction	1	1	1	1	1	1	1
Geography	1	1	1	2	2	1	1
Modern Languages ...	3	3	3	4	4	3	3
Mathematics	3	2	2	2	2	2	2
Book-keeping	—	1	1	3	3	1	1
Physics and Chemistry	1	1	1	1	1	1	1
Natural History and Hygiene	1	1	1	1	1	1	1
Horticulture	1	1	1	1	—	—	—
Political Economy ...	—	—	1	—	1	—	1
Drawing and Modelling	3	3	3	1½	1½	4½	4½
Manual Work	5	5	5	3	3	6	6
Gymnastics	2	2	2	2	2	2	2
Singing	1	1	1	1	1	1	1
Total hours per week	29	29	29	26½	26½	27½	28½

We see, then, that in France everything is done to extend the school-life of the children, whilst even in the lowest schools leaving certificates are granted. The possession of this certificate is an important thing, for on engaging ex-scholars, masters and mistresses invariably ask if the candidate possesses it. In the Primary schools of France the obtaining of these certificates is, perhaps, somewhat too easy. Nevertheless, such a great authority as Sir Joshua Fitch has strongly advocated a similar system for this country.

It must be remembered that all the above applies to elementary education, open free to the poorest child. The secondary schools of France are not, perhaps, so well arranged as those of Germany. These latter will be found dealt with in the succeeding pages.

Switzerland.

Seeing the number of famous educationalists that have had their birth and home in Switzerland,* one is not surprised to learn that that mountainous country possesses a good educational system. Its chief boast is that anyone may go, without a break, from the bottom to the top—from the free school to the University.

The commencement of Swiss education is the Kindergarten school, taking children from four to six years of age. These are usually unaided private ventures, and exist only in towns, but the fees payable are usually very low. At six school-work properly commences; every child must attend school from that age until the *completion* of the fourteenth year. The schools are State-aided and free to the children. The teacher or teachers are fully trained and all of equal rank; the schools are mixed as to sex; whilst the majority of the teachers are men. The course from six to twelve years of age is primary, the next two years being supplementary. Should there be special reasons for it, a child may be excused attendance, save for two mornings a week, during these two years; but the excuse is only valid for children required to work at home, as no child may work in a shop or factory under the age of fifteen years. At twelve the child has the option of passing to the Secondary school for a three years' course for boys—four years in the case of girls—or of proceeding direct to the Gymnasium for a six and a half years' course. The fees payable both at the secondary school and the Gymnasium are low, as both these institutions are State-aided. The course at the Secondary schools leads up to a course at a Technical school, and this in turn prepares the student either for the 'Polytechnicum' or for trade and business life.

The Gymnasium grants, to those who have passed satisfactorily through its entire course, a certificate admitting the student to the University or the Polytechnicum. The Universities of

* See 'Across the Great St. Bernard,' by the Author.

Switzerland have courses and grant degrees for Theology, Medicine, Philosophy, and Law, and admission is gained to them only through the Gymnasium.

The special feature of Swiss Higher Education is its Polytechnic Institute at Zurich. This is in reality a Technical University, to which admission is gained by possession of the leaving certificate of a Gymnasium or a Technical school, and its courses cover Architecture, Civil, Mechanical, and Electrical Engineering, Chemical Technology, Agriculture, Philosophical and Political Science, and the Science and Art of Teaching. The course in any subject lasts for three years, whilst the fees amount only to some £8 or £10 per annum. The Zurich Polytechnicum is one of the best equipped Technical High Schools in the world, and its great and beneficial influence on Swiss commerce and manufactures is hardly to be measured.

Scandinavia.

In regard to the Scandinavian school system, one cannot but be impressed by the important position held by *drill and manual* work. Two other features to be noted are the strong tendency to remove Latin from all the earlier stages of education, and the subsidizing of private effort on condition it complies with Government requirements and submits to Government inspection.

Education is carried on under conditions and difficulties peculiar to Scandinavia. The population is scattered over country districts; towns are few and seldom large, therefore it is difficult so to arrange that schools shall be near enough for children to attend. Yet this difficulty has gradually been overcome, and education has spread to the remotest parts. It is incumbent on every child to attend school from the end of its seventh to the end of its fourteenth year, after which period everything is done to induce the children to extend their education by means of continuation schools, evening schools, and suchlike.

Peculiar to Scandinavia and Denmark are the People's Colleges. These are held in the winter, and attended by pupils of eighteen

years and upwards. The College course extends over two sessions. The first winter is devoted to Higher Education in such subjects as the Mother Tongue, History and Geography, Central and Local Administration, Rural Economy, Natural Science and Hygiene, Arithmetic, Geology and Surveying, Book-keeping, Drawing, Writing, Singing, and Gymnastics. The second winter is given over to Husbandry, Stock-breeding, Forestry, etc., for the men, and Butter and Cheese-making, Laundry Work, Nursing, and suchlike, for the women. It must be remembered that these classes are drawn entirely from the peasantry, who thus profitably employ the long winter months, when little can be done in the fields.

Sweden has been the pioneer of the two great factors in modern education upon which I have ventured to lay especial stress—viz., manual training or *sloyd* work and physical drill. The aims of such manual training, as set out by the Minister of Education, are 'that from a simple working drawing—which the scholars should be able to execute themselves—they can make some article of daily use and of simple form, or that they shall have practice in doing the ordinary needlework of everyday life.'

The Sloyd System.

The system of educational manual training evolved by Swedish educationalists—the *sloyd* method—is intended, not to train the children as artisans, but to develop them physically and morally by teaching them to use their eyes and their hands, and accustoming them to work with attention, application, and neatness.

Sloyd teaching demands no great amount of work from the pupil, but it demands scrupulously careful and conscientious execution, and this can be attained by a slow and graduated increment in skill, starting from the very simplest tasks. The instruction follows a 'series of exercises' in the working of the material with one or more tools in a particular way and with a definite object in view. The models thus produced should be æsthetic in form, and of some practical use, and the work may

act as a valuable link between the school and the family if the objects made by the children can be utilized at home. The object of *sloyd* being to teach the child self-dependence, and to make him think and observe as he works, the teacher should never perform any portion of the pupil's task. The child's instruction in drawing should be directly connected with his sloyd training; he should first draw a sketch of the model he is to make. The greater part of the sloyd work is confined to wood, as being most suitable for children of from ten to fourteen years of age, but instruction in metal and paper work, as well as wood-carving and turnery, has been carried out in some of the schools.

The advantages of drill are thus referred to in the Education Code: 'That by means of gymnastics suited to the age of the pupils, bodily health and strength are to be promoted, and contribute to the harmonious development of the whole person.' The system of drill practised in Scandinavia is known as the Ling system, from its founder, Ter Henrik Ling (1776-1839), who founded the Central Gymnasium at Stockholm in 1813, and whose work was afterwards amplified by his son, Hjalmar Ling. We cannot do better than quote the words of the founder to exemplify the work he undertook:

'In order to attain its object, gymnastic training must be founded on an intimate acquaintance with the anatomical and physiological organization of the human body, as well as with the physical laws of motion; for all parts of the body act and react on each other, and bloodvessels, nerves, and muscles develop simultaneously. The true aim of gymnastics is to make this interaction and development pursue a normal and harmonious course, and to produce a calm and equable nervous condition. At the same time, there must be a corrective element in physical as in moral training; it must strive to compensate weaknesses and eradicate defects. Such a system of physical training is as desirable for, and suitable to, girls as boys; it may be enjoyed alike by rich and poor, by strong and weak.'

Hjalmar Ling made a classification of many thousands of movements in ten categories, according to their action on the

different parts or functions of the body, the movements being placed in the categories in a scale of ascending effort. In practice a certain number of movements requiring equal effort are selected from these categories to form the daily exercise, and amongst these are interpolated movements requiring a less degree of effort, thus making the daily task 'a gymnastic entity,' which brings not only the separate organs, but the entire organism into play. The exercise must be proportioned accurately to the powers of the pupil, and the classes so arranged that pupils of equal physical capacity work together. In order to insure sufficient, while preventing excessive, exertion, the co-ordination of movements in the daily task should be arranged to produce a constant equilibrium between the muscular labour, the respiration, and the functions of the heart; the movements must affect alternately different groups of vessels in order to regulate the supply of blood to different parts, and the frequency of respiration must be varied at the same time that its capacity is increased. During the first half of the lesson a greater effort should be required for each succeeding movement; during the latter half the efforts should as gradually decrease, so that the end of the lesson leaves the respiration and heart action normal and vigorous. Ling discountenanced any sort of emulation in gymnastics as tending inevitably to over-exertion and partial over-development.

All the gymnastic instructors of the country, men and women, civil and military, are now trained at the Central Gymnastic Institute, which has more than justified the hopes of its founder. The men's courses last from one to three years, and the women's two years. The third year is especially devoted to medical gymnastics, in which a special course for doctors is held. Short courses in medical gymnastics form part of the curriculum of the medical faculties of Upsala and Stockholm.

Sweden.

In Sweden secondary education consists of a nine years' course in a gymnasium, commencing at nine years of age, or a similar course in a private school, which can grant equal privileges as

to leaving certificates, provided it conforms to the Government syllabus and is inspected by the Government inspectors. Of the nine years, three are devoted to general education, with an optional branching to classical or modern side at the fourth year, and in the case of the classical students a further option of Greek or non-Greek school at the sixth year. But the Secondary schools, especially for girls, are not so well arranged as in Norway, which has recently revised its educational ladder. In this country the Primary school (*folke* school) grants at the end of its fifth year a certificate carrying the scholar to the Lower Secondary, or *Middel*, school; a four years' course here gives the necessary certificate to attend a three years' course at the Gymnasium. On entering the latter the choice falls between three schools: (1) the *Real*, or Science, (2) the Modern Language, and (3) the Latin. In order that it may be better understood how little these differ from one another, the hours devoted to each subject per week are given in the appended tables:

Norway.

MIDDEL SCHOOLS TIME-TABLE, NORWAY.

Subjects. / Class ..	I.	II.	III.	IV.
Age ...	11-12.	12-13.	13-14.	14-15.
Religion	2	2	2	1
Norwegian	5	4	4	4
German	6	5	5	5
English	—	5	5	5
History	3	2	3	3
Geography	2	2	2	2
Natural Science...	3	2	2	3
Arithmetic and Mathematics ...	5	5	5	5
Drawing...	2	2	2	2
Writing	2	1	—	—
Gymnasium	3	3	3	4
Manual Work	2	2	2	2
Singing	1	1	1	—
Total hours per week ...	36	36	36	36

HIGH SCHOOLS TIME-TABLE.

Course ... / Subjects. / Class ...	Science Course.			Modern Language Course.			Latin Course.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.
Religion	1	1	2	1	1	2	1	1	2
Norwegian	4	5	4	4	6	5	4	5	4
German	3	3	3	3	3	3	3	3	3
English	4	3	2	4	7	6	4	2	2
French	4	2	2	4	4	4	—	5	4
Latin	—	—	—	—	—	—	6	7	7
History	3	3	3	3	5	5	3	3	3
Geography	1	1	1	1	1	1	1	1	1
Natural Science ...	4	5	6	4	1	2	4	1	2
Mathematics	4	5	6	4	2	2	4	2	2
Drawing	2	2	1	2	—	—	—	—	—
Gymnasium	6	5	5	6	5	5	6	5	5
Singing	—	1	1	—	1	1	—	1	1
Total hours per week	36	36	36	36	36	36	36	36	36

The leaving certificate of the Gymnasium serves as the entry to the University.

In Scandinavia the Primary schools are mixed schools, and men predominate as teachers. The salaries are paid by the State according to length of service, and are liberal, ranging from £80 a year to £320, with pension after twenty-five years' service. It is interesting to note that in Norway and Switzerland (as has been pointed out) the educational ladder extends from the Primary school to the University in unbroken succession, and this is made more easy owing to the large number of *free seats*, and also a good number of scholarships that are granted from school to school as the scholar works upwards.

Germany.

No other country possesses such a complete system of State-supported schools as Germany; the Government controls and fosters education from the lowest to the highest. Every German boy and girl must attend school from six years of age to fourteen,

and for that purpose the State provides Primary free schools. But it does more than that: it supplies teachers, every one of whom is properly trained, in addition to being well educated. Training is the watchword of the German teacher. The possession of a University degree of the highest class does not absolve a teacher from learning the methods proper to his profession.

In the country the schools are mixed, and the teachers are then men. In towns separate schools are provided for the boys and the girls; but even in the latter men are usually found as teachers of certain subjects. Moreover, the German Government long since appreciated the fact that one man cannot teach every subject—from sewing to Arabic—and so we find in all the larger schools subject masters and mistresses instead of form teachers. The teaching, moreover, is real, the scholars being led as much as possible to discover for themselves.

The State, having provided the schools and the staff, not only enforces education, but it makes the school and the teacher paramount; the word of the teacher is law, and he cannot be changed by an elected board. The teaching course is laid down, and cannot be departed from; neither can a parent take a child away and send it to another school, for no schoolmaster can admit a child without a proper conduct certificate from his last master. (Refer to p. 714 for detrimental effect of our possessing no such system in London.)

In Germany the system of primary education does not lead up to the system of secondary education; the former does not constitute a rung in the ladder to the University, as is the case in Switzerland and Norway. There has, however, been founded in Berlin a school which by means of free scholarships allows of pupils leaving the primary school at eleven years of age, and receiving a four years' course of higher instruction than that of the elementary schools. Success in this school may lead to a scholarship for Charlottenburg or other of the Technical High Schools. Its time-table of a six years' course is thus:

BERLIN REALSCHULEN TIME-TABLE.

Subjects. / Class ...	VI.	V.	IV.	III.	II.	I.
Age ...	9-10.	10-11.	11-12.*	12-13.	13-14.	14-15.
Religion	3	2	2	2	2	2
German	7	7	4	4	3	3
French	—	—	8	8	6	6
English	—	—	—	—	6	6
History	1	1	2	3	2	2
Geography	2	3	2	1	1	1
Mathematics	5	6	6	6	5	5
Natural History	2	2	2	2	2	—
Physics	—	—	—	2	2	2
Chemistry and Mineralogy	—	—	—	—	—	2
Writing	3	2	—	—	—	—
Drawing	2	2	2	2	3	3
Gymnastics	3	3	3	3	3	3
Singing	2	2	2	2	2	2
Total hours per week ...	30	30	33	35	37	37

Again, no country has a finer system of secondary education than Germany. It has not been suddenly evolved, but represents the steady, persevering outcome of the labours of educationalists whose names are now known throughout the world as leaders of modern thought. The higher schools of Germany have descended from the old Latin schools of the monasteries, and even now in the curricula show the evidences of their classical origin. Originally classical schools, turning out scholars in Greek and Latin, they felt the influence of the modern schools of thought, and accordingly widened their subjects to meet more modern requirements. At first admitting only of an alternative course, including Latin and modern languages, they later established a third course combining modern languages with mathematics and science, whilst at the same time the scope of subjects of the classical school was widened.

This threefold division is the present basis of Germany's

* Into this class, and at this age, the scholarship pupils from the elementary schools pass.

Secondary schools. They have (1) the *Gymnasium*, taking Latin and Greek; (2) the *Realgymnasium*, taking Latin, but no Greek; (3) the *Oberrealschule*, without Latin or Greek. Of these, the Gymnasium is paramount. Until quite recently only those who had been through its course could proceed to the University, there to take up the study of Philosophy, History, Classics, Law, Theology, or Medicine. A full course at the *Realgymnasium* admitted to a University course and degree in modern languages, also to the Military and Naval services. The *Oberrealschule*, on the other hand, could only send its students to the Polytechnicums. By the decree of 1900, however, all these three schools were given equal rights, and the time-tables as then drawn up for them were:

GYMNASIUM TIME-TABLE.

Subjects. / Class...	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.
Age ...	9-10.	10-11.	11-12.	12-13.	13-14.	14-15.	15-16.	16-17.	17-18.
Religion	3	2	2	2	2	2	2	2	2
Mother Tongue ...	3	2	3	3	2	2	3	3	3
Historical Narration ...	1	1							
Latin	8	8	8	8	8	7	7	7	7
Greek	—	—	—	6	6	6	6	6	6
French	—	—	4	2	2	3	3	3	3
History	—	—	2	2	2	2	3	3	3
Geography	2	2	2	1	1	1			
Mathematics	4	4	4	3	3	4	4	4	4
Natural Science ...	2	2	2	2	2	2	2	2	2
Writing	2	2	—	—	—	—	—	—	—
Drawing	—	2	2	2	2	—	—	—	—
Gymnastics	3	3	3	3	3	3	3	3	3
Singing	2	2	2	2	2	2	2	2	2
Total hours per week	30	30	34	35	35	35	35	35	35

NOTE.—Where the times for the two subjects are bracketed together it is left to the Rector to use his discretion in allocating the time between them, the figures being suggestive.

REALGYMNASIUM TIME-TABLE.

Subjects. Class ...	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.
Age ...	9-10.	10-11.	11-12.	12-13.	13-14.	14-15.	15-16.	16-17.	17-18.
Religion	3	2	2	2	2	2	2	2	2
Mother Tongue ...	3	2	3	3	3	3	3	3	3
Historical Narration ...	1	1							
Latin	8	8	7	5	5	4	4	4	4
French	—	—	5	4	4	4	4	4	4
English	—	—	—	3	3	3	3	3	3
History	—	—	2	2	2	2	3	3	3
Geography	2	2	2	2	2	1	—	—	—
Mathematics	4	4	4	5	5	5	5	5	5
Natural Science ...	2	2	2	2	2	4	5	5	5
Writing	2	2	—	—	—	—	—	—	—
Drawing	—	2	2	2	2	2	2	2	2
Gymnastics	3	3	3	3	3	3	3	3	3
Singing	2	2	2	2	2	2	2	2	2
Total hours per week	30	30	34	35	35	35	36	36	36

OBERREALSCHULEN TIME-TABLE.

Subjects. Class ...	VI.	V.	IV.	IIIb.	IIIa.	IIb.	IIa.	Ib.	Ia.
Age ...	9-10.	10-11.	11-12.	12-13.	13-14.	14-15.	15-16.	16-17.	17-18.
Religion	3	2	2	2	2	2	2	2	2
Mother Tongue ...	4	3	4	3	3	3	4	4	4
Historical Narration ...	1	1							
French	6	6	6	6	6	*5	4	4	4
English	—	—	—	5	4	4	4	4	4
History	—	—	3	2	2	2	3	3	3
Geography	2	2	2	2	2	1	1	1	1
Mathematics	5	5	6	6	5	5	5	5	5
Natural Science ...	2	2	2	2	4	6	6	6	6
Writing	2	2	2	—	—	—	—	—	—
Freehand Drawing ..	—	2	2	2	2	2	2	2	2
Gymnastics	3	3	3	3	3	3	3	3	3
Singing	2	2	2	2	2	2	2	2	2
Total hours per week	30	30	34	35	35	35	36	36	36

* It is left to the option of the Rector to divide the hours between French and English in the last four years in whatever manner he may think advisable, but stress is laid on the commercial importance of English.

A full course in a high school, as will be seen, lasts for nine years, commencing when the child is nine and ending at eighteen. Prior to this there is an elementary course in a preparatory school, usually attached to the high school. The State does not prevent private schools from being established, but it insists on trained teachers in these schools, and also on inspection of them. Moreover, the fees in the State high schools are so low—from £3 to £9 per annum—that private enterprise cannot compete against them. The headmaster or *Rector* of a German High School is paramount in his school as regards the scholars. He insists on regular attendance, and he can control their outdoor actions even in the minutest details, such as singing or acting in public or attending a dance. Should the *Rector* be displeased with a pupil, his dismissal without character precludes that pupil from admittance to another State school. Moreover, parents cannot remove their children without good cause for the like reason—failure to obtain another school. At nine years of age the parent has to choose one of the three courses for his children; that done, there is no departing in the smallest degree from its curriculum. Year by year, if the scholar has made satisfactory progress in all subjects, he is promoted from class to class, until, on the completion of the ninth year, he finds himself in possession of a certificate admitting to the University, and limiting his military service to one year. In the High Schools the teachers are always subject teachers, who have received a thorough training for their work, the greater proportion of them being men, even in the girls' schools. Their teaching reflects their training, and is real and alive. On the other hand, the movements and discipline of the school reflect the army training: everything moves with the precision of a regiment on parade. Many hours are devoted to gymnastics and to singing, in both of which they far excel any average British school. Of games they have practically none, though there is a movement afoot to introduce some of ours amongst them.

Germany is justly proud of her system of higher education, and spares no expense in regard to it. One wonders what would be

the feelings of a British Minister of Education on being told by a headmaster at the end of the year that he had considered it beneficial to spend £2,000 on his school more than was estimated for. Yet this actually happens in regard to the High Schools of Germany, and the amount is paid without comment.

The teachers are civil servants of the State, receiving from it, not only salaries, but pensions, and even their widows receive pensions from the Government.

To sum up, what is to be learnt from a study of these various systems? In Elementary Education we might well take a lesson from France in regard to the teaching of agriculture, and also as to the leaving certificate. We might, moreover, with advantage copy all these countries in the employment of trained male teachers, the proportion of our untrained teachers being far too great. Manual work, as I have ventured to impress, might with great advantage find a place in our system, in the same way as physical drill has commenced to do in the best schools of our large towns.

Secondary education would appear to be the question of the hour. At the top of our system we have our old-established Public Schools, fulfilling a certain requirement in the educational fabric. Whilst they may be trusted to uphold their traditions, it is to be hoped they will show no lethargy in suiting themselves to the requirements of the times. When, however, we descend and consider industrial education, it must, I feel, be admitted that reforms such as those contained in the report of the British Association to which I have referred are undoubtedly called for. More should be heard and seen of physical and manual training, whilst the narrow-minded view that *drill* engenders a military spirit should no longer be allowed to weigh. On the Continent the military service tends to lengthen school life, for a complete school course cuts off two years of soldiering; hence it is better to stay two or three years longer at school, and by so doing become really free for business life two years earlier. In England it is generally considered that sixteen is old enough to make a start in life. But if we had a proper intermediate

High School system, giving a general education to fourteen years of age, and then a threefold branching from thence to (1) a Classical, (2) a Modern Language, or (3) a Technical School, I am persuaded that another two years might be allowed, and eighteen become the more general age for the completion of education. The threefold division at nine, as in Germany, is, one ventures to think, specializing too young, for it often results in boys, who are quite unfitted for the branch chosen, being put back over the same course year after year, until at sixteen or eighteen they are not half-way up the school.

One thing, apparently, we have yet to learn: that is, that teachers should be technically trained, as doctors are. A man may be never so learned, yet in default of such training he may be totally unable to efficiently impart his knowledge to others. In technical training especially, and generally, the State should help forward the problem of education by more liberal aid. Money thus spent, I have endeavoured to show, is money *well* spent, and in fulness of time will repay the nation with full interest.

Lastly, we have too many outside authorities, each holding examinations. To quote a distinguished German schoolman, who has spent some years in our schools: 'In England there are so many examinations, all differing from one another, that a school is reduced to chaos, for some pupils have to be coached for one, others for another, and so on. The English parent has also his ideas on the time-table, and one boy has to do more Euclid, another more book-keeping, etc. Subjects are sold like groceries in paper packets, so that one begins to think a liberal education is a thing to be regulated by the purse or the parsimony of the parent.'

One therefore looks, and this not without solicitude and anxiety, to our eminent teaching experts—who, it is obvious, are doing their very best—for such necessary reform as shall make for *efficiency* in our educational system.

APPENDIX II. TO CHAPTER V.

NOTE ON CHILDREN'S WORKSHOPS IN STOCKHOLM.

THERE exists in Stockholm a unique system of taking care of and feeding children between school hours, known as the 'Children's Workshops.' These are established and maintained by private philanthropy, and are usually managed by a committee of ladies. The function will best be understood from the following heads, taken from one of the prospectuses issued in connection with them: 'The children's workshops have been established—(1) To take charge of poor children, or of children whose parents are engaged in factories or elsewhere during the day and unable to supervise them. The hope is to thus save young children from the dangers of the streets, particularly from the temptation to spend the hours in which they are not at school in begging or casual street trading. (2) To inspire early in the child a love of work, to help the child by manual instruction, and to put it in the way of gaining an honest living later on by steady application to some regular trade or occupation. (3) To supplement pedagogic influences and discipline by a discipline and influence analogous to those to be found in a thoroughly good working-class home.'

Children of from seven to ten years of age attend the workshop from 11 a.m., when school closes, until 1 p.m., when it reopens, and there they receive their dinner. Children from ten to fourteen can return from 5 p.m. to 7 p.m. on three days of the week, when they also receive their supper.

The trades are taught by properly qualified persons, and comprise tailoring, dressmaking, shoemaking, cobbling, clothes-mending, weaving, plaiting, basket-making, carpentry, brush-making, mat-making, cabinet-making, wood-carving, metal-work, toy-making, raphia-work, etc. The meals given to the child are considered a payment for work done, so that he or she early learns that only by work can a living be earned.

The work done is sold generally at bazaars, when higher prices can be obtained. The total cost is stated to be but a little more than a pound per child per annum.

APPENDIX III. TO CHAPTER V.

SOCIAL ORGANIZATIONS FOR AIDING THE UNEMPLOYED.

THE problem of finding work for the unemployed and attempting to raise the workman who has fallen to the lowest depths back to his proper position is one that has been the particular care of two organizations—viz., the Church Army, of which the Rev. W. Carlile is the guiding spirit, and the Salvation Army, founded by 'General' Booth. The former has some twenty-two years of hard evangelical work to its credit—whilst the social work has been in operation since 1889. A glance at the figures of the cases under its care for the year 1903 will give some idea of the amount of social work accomplished.

SUMMARY OF WORK AMONG MEN FOR 1903 OF THE SOCIAL DEPARTMENT OF THE CHURCH ARMY.

Labour home cases, London	1,862
Labour home cases, provinces	3,229
Admissions to labour lodging homes	3,083
Admissions to *Morning Post* home	11,907
Winter relief cases, special distress cases, and *Morning Post* auxiliary homes admissions	17,086
Admissions to Banner Street	12,073
Applicants at headquarters and inquiry office	6,452
Individual cases investigated in labour bureau	1,835
Convicts discharged direct to the Society	226
Prisoners' wives assisted	136
Swansea Discharged Prisoners' Aid cases	346
Applicants to provincial labour homes who for various reasons could not be received	2,483
Total	60,718

If we examine some of these items carefully, we shall get an idea of how the work is carried on and its value in helping forward the social problem of the unemployed. First, in regard to the labour home cases, we find that these were dealt with in the following manner:

	London.	Provincial.
Became inmates	1,334	2,922
Stayed three days or under	287	307
Given admission orders, but did not go	241	—
Total	1,862	3,229

These men have been classified as follows:

	London.	Provincial.
Never in prison, workhouse, or casual ward	984	1,322
Had been in workhouse only	253	212
„ casual ward only	222	923
„ workhouse and casual ward	26	141
„ prison	377	631
Total	1,862	3,229

The actual inmates of the homes were:

	London.	Provincial.
Single	1,072	2,488
Married	191	205
Widowers	71	229
Total	1,334	2,922

And their professed religions were:

	London.	Provincial.
Church of England	1,199	2,488
Roman Catholic	57	205
Other denominations	78	229
Total	1,334	2,922

These figures serve to show that the men admitted to the Church Army homes are of all conditions, both social and religious The Rev. W. Carlile, in a pamphlet published a year after the commencement of the work, when all the country was

ringing with the scheme just set forth by 'General' Booth in his book entitled 'Darkest England,' stated that the dominant idea of the Church Army was to bring the men into small labour homes of from twenty to thirty in each home, and there instil into them the love for work, and the tenets of a Christian life. He required the men to agree to stay at least two months in the home. Their work would be wood-chopping, envelope-addressing, or paper and rag sorting. They would receive board and lodging and 2d. per day as pocket-money, whilst anything above 1s. 2d. a day that their work might entitle them to would be credited to them for their future benefit. Three evenings a week and Sunday afternoons they would be free to go out, and the possession of the pocket-money, though a small sum, served as a test to see whether they would be able to resist the temptation to take to drinking again or could act in a becoming manner.

The homes consist of a large hall, used as workshop by day and meeting-place at night, dormitories, a part set aside as a chapel, whilst the rougher work, such as wood-chopping, etc., is usually done in the basement. The idea of the small home is that a better moral effect can be obtained over the men in this way than in large labour shelters.

The Army has at present 120 labour homes and agencies throughout the country, and is thus more or less in touch with the condition of the labour market in all parts. A few typical cases may show how the work of the labour homes has succeeded. A man trained to a good mechanical trade, reduced by drink almost to beggary, was admitted to a labour home, and being willing to work for his keep, remained there for eight months. He was then fitted out by the 'Old Clo' Department,' and sent to a good situation. Another man, discharged from an infirmary where he had been treated for a complaint of the leg, was admitted to the home. He worked steadily for three months, when employment was found for him. A good many soldiers, unable to find work on leaving the army, come to the labour homes, and after a stay there are found situations. The cases

of discharged prisoners are difficult to deal with, and the Army had no less than 1,668 of such in the year 1903, and 34,041 days' work were found for them in the labour homes.

It is gratifying to be able to state that a large percentage of such cases turn out well in the end; being once started upward, they continue to rise by their own exertions. But some cases are irreclaimable, as, for instance, a man who on admittance acknowledged that he had done no work for fifteen years. Next morning, as soon as the doors were opened, he left hurriedly, exclaiming that he would rather die than work.

Work is the test of the Church Army scheme. A man must either work for his keep or leave, and a glance at what becomes of those admitted to a typical home shows how the work test answers. Taking the East London Labour Home in the Whitechapel Road, we find of the 184 cases admitted, 56 obtained situations, 3 joined the army, 1 was restored to his friends, 1 transferred to another home, 3 sent to the hospital, 1 was arrested, 10 were dismissed, 59 left to seek work, 19 remained in the home at the end of the year, and 31 left within three days of admittance.

The largest of these labour homes is that on the Embankment, opened by the initiative of the *Morning Post*, of which Lord Glenesk is president. The number of admissions in 1903 was no less than 11,907. Of these, 10,743 received assistance by being given temporary work, food, lodging, clothing, etc., whilst in the auxiliary Embankment homes and labour yards over 17,000 cases were dealt with. Of these, 12,286 received temporary work, food, lodgings, clothing, etc., to help them tide over the time when labour is difficult to find and labourers form the great mass of the unemployed. The other cases were dealt with in the ordinary way. Some obtained situations, some joined the army or navy, a few were emigrated, 56 still remained at the end of the year, and some took themselves off within three days of admittance.

The great difficulty is to know what work to give the men to do. With a population that is always shifting it is wellnigh

impossible to keep a regular trade going as a profit-earning concern; moreover, the majority of those seeking admission to the homes are of the unskilled class.

Paper collecting and sorting, rag-picking, and wood-chopping, are the three main occupations of the labour homes. This labour is not profitable; it is impossible for a man to earn the whole of the cost of his keep by these occupations.

Besides the labour homes, the Church Army possesses a number of lodging homes, where beds and meals can be obtained at exceedingly low rates. These are largely utilized; one coffee tavern supplied 305,255 meals in a year, whilst a lodging-house let 14,785 beds in the twelve months. These institutions, of course, must perforce compete with private 'enterprise'—if there is any enterprise—in the supply of meals and beds of the humblest class. They have one advantage, that by cutting the price to the lowest possible limit they place a meal within reach of those who might otherwise be unable to purchase one.

A number—some 63 in 1903—of the men who come under the care of this Society are emigrated to Canada, South Africa, or Australia; but this branch requires the greatest possible care, as it would be useless to send a man to a colony unless it is fairly sure he will lead a hard-working life there. There is a department to deal with women in need, but its work is practically confined to London. It has thirteen homes, into which, during 1903, 2,123 cases were admitted, whilst 4,494 received help.

A department for receiving clothes and furniture plays an important part, as from its stores the men and women from the labour homes are refitted to go out to situations, whilst the furniture helps to restart the home of the married man for whom employment has been found. Labour bureaux exist for both men and women. To these masters or mistresses in want of workmen or servants apply, and suitable candidates are sent them. Men out of work put their names on the books, and as fast as vacancies occur they are filled up from these.

An enormous amount of work is carried on by the Church Army in its evangelistic department. A great part of the staff.

are honorary, and the publications of the Society pay for the whole of the headquarters staff. Thus, all the subscribed funds go directly to the purposes for which they are contributed. The amount spent on the social work of the Church Army during the year quoted was £148,000. Larger funds would enable it to deal with cases that it is now forced to refuse, but it set out with the intention to live within its income, and laudably keeps to that resolve.

The other social working society referred to, the Salvation Army, also combines religion with its work among the unemployed, outcast, and thriftless members of society. Its present work is the outcome of the book, 'Darkest England,' written by 'General' Booth in 1890. The funds then subscribed for the work enabled the Army to start its rescue homes, food and shelter depots, labour bureaux, labour homes, and farm colony.

Its rescue homes are essentially what they are styled; they receive the outcasts, prisoners, starving, and abandoned—both men and women—and by supplying them with food and clothes in return for work, attempt to tide over distress or raise them from the depths to which they have sunk to a level where they are again self-supporting. The labour bureaux supply men to employers, and do what would often be impracticable to the men themselves. A master in the Midlands wanting a number of hands applies to the Army; they send the men from London, or wherever they may best be able to supply him, defraying the men's railway fares if they are unable to pay them themselves. The antecedents of these men are looked into, and their subsequent work recorded, so that if they again apply to the Army for help the officers know whether they are deserving of aid, and somewhat as to the best way of aiding them.

The workshops of the Army deal with waste-paper, rags, and wood-chopping, but such trades as bakery, carpentry and joinery, tambourine-making, mattress-making, saw-milling, cabinet-making, sack-making, painting, wheelwrighting, and tin-working, are carried on. Here, again, the principle of help in return for work is carried out. A man works for his keep, but if he can

accomplish more work than is sufficient for this he is credited with a certain amount, to enable him to accumulate a small sum of money to start out again in life.

On a man being received in the rescue home at night he has a bath, his clothes are baked in a sulphur oven, and a supper is given to him. In the morning he begins work with those who have been in the rescue home for different periods. Work commences at 6.45 a.m. At 8.30 his work will be examined, and a breakfast ticket issued to him. There are four classes of tickets: the first class is an ample meal, the second is sufficient, the third is insufficient, and the fourth serves but to show the man how hungry he is. In the case of an incomer weakened by exposure and want of food, he is put for the first two or three days into the second-class dietary, though his work may not entitle him even to a third-class ticket. After three days tickets will be issued to him according to his work, but if he shirks and fails to earn a third-class ticket he is dismissed; for a fourth-class meal is insufficient to keep him, neither is it intended that he should live upon it. Exceptions are, of course, made, but the 'work-shy,' the lazy, and the shirker are not allowed to impose upon the benevolence of the Army; if he will not work, then he cannot eat. Thus true charity is dispensed by the Salvation Army, for it is at all times ready to help the needy and deserving. There are three meals served during the working day of nine hours. The genuine worker receives his three good meals, and, besides, gets credit to his account for the excess of his labour over his cost of keeping; from this credit he may buy himself new clothes from the stores.

When it is remembered that an expert wood-chopper or sack-sewer would find it hard to make a living, it can easily be seen that the men working in these rescue homes cannot make them self-supporting. Mr. Bramwell Booth informs me that a worker costs, on an average, 1s. 6d. a week over and above the earnings; but he also points out that in prison a man costs 9s. per week, in the workhouse 8s., and in a lunatic asylum 10s., or more. So that every man maintained in the Army rescue home is a distinct gain to the country in actual monetary expenditure. Sir Walter

Besant has stated that a loafer in the London streets consumes each year £40 worth of food, clothing, etc., for which he does nothing, whereas he ought to reproduce the equivalent of £60 per annum by his labour. He is therefore robbing the country of £100 per annum. Thus every man rescued is equivalent to an addition of that sum per annum to the resources of the country. This is but half the figure put by some authorities.

This side of the Salvation Army work, it will be seen, is very similar to the work of the Church Army. Both aim at giving a free meal to the starving as a start, and then by providing temporary work to enable a man to earn his meals until a situation can be found for him—with this difference: that whereas the Church Army works with small homes, the Salvation Army has large labour factories.

The Salvation Army possesses a unique feature in its farm colony at Hadleigh in Essex; the Church Army has a small market-garden home near Dorking, but only nine men were sent there during 1903.

The Hadleigh colony is a large one. To this are drafted those men who, having fallen to the lowest of the rungs in the social ladder, have yet shown by their work at the labour home that they are willing to raise themselves by honest toil. Here there is a farm colony, a market-garden, nursery, dairy, and poultry farm, cattle, horses, and piggeries—in fact, the whole of the agricultural employments open to men. They learn to handle a spade, plough a furrow, weed, hoe, use a scythe, feed and tend cattle, pigs, and poultry. In return for their work the men receive board and lodging, and money payment when they can do more work than recoups the colony for their lodging. Stores and shops are erected by colony labour, and brick-making is a large industry in the settlement. These men when they have learnt their trade are sent out as agricultural labourers, gardeners, or emigrated to our colonies.

A few figures for the year ending September 20, 1903, will give some idea of the magnitude of the work carried on.

DARKEST ENGLAND SCHEME: SOCIAL WORK FOR THE YEAR ENDING SEPTEMBER 30, 1903.

Number of meals supplied at cheap food depots ...	3,381,105
Number of cheap lodgings for the homeless ...	1,325,056
Amount of cash received for food and lodgings ...	£32,639 15s.
Number of applications from unemployed registered at labour bureaux	12,836
Number received into factories	4,872
Number for whom employment has been found ...	14,062
Number of ex-criminals received into homes ...	732
Number of women and girls received into homes...	2,211
Number of women and girls for whom situations were found or who were restored to their friends from the rescue homes	1,855

This work is carried out by means of 25 rescue homes, 24 food and shelter depots, 11 labour bureaux, 11 labour factories, 10 other social institutions, 2 children's homes, an ex-criminals' home, and the farm colony, making a total of 85 establishments.

These two organizations, between whom keen rivalry exists in doing good work, and the greatest friendliness in regard to the method of doing it, aim at aiding what has become known as the 'submerged tenth.' A man, having fallen to the lowest depths, dragged down by dissoluteness, drink, crime, or indiscriminate charity and promiscuous doles, is taken in hand, and if any good be left in him he is raised again to the status of a self-respecting citizen.

This is noble work! It does not, however, touch or solve that difficult industrial problem, how to help honest men temporarily thrown out of employment. By slackness in trade, a severe winter, or other circumstances, thousands—skilled and unskilled alike—are deprived of work. If these be honestly working industrial units, no one would wish that they should become disenfranchised through their need, nor that their hardship should be rendered one whit more severe than is absolutely necessary. Free breakfasts to his children, public soup-kitchens, coal and blanket tickets, though of great assistance to him,

cannot *per se* keep his home together; hard-earned effects must go, and his home also, for he cannot pay rent from doles. It is abundantly apparent that what is required for the solution of this difficult phase in industrial economics is, not a fund of money, but a reservoir of work, so to speak, which may be drawn upon temporarily in emergency. What is required is an emergency workshop, State established, though not necessarily State supported, where men thrown out of employment might at once find occupation whilst finding a new place. In such an emergency workshop the goods produced should be Government stores, in order that such production should only interfere in the minimum degree with ordinary trade. It is obvious that the amount there earned would be, and should be, less than the average of ordinary occupation; for the object would be temporary, not permanent, employment. It is also obvious that it should be piecework, for any system of weekly or hourly wage would not meet the case, seeing that experience has shown that it is difficult to find men, especially of the type likely to be out of work, who do honest labour when they are aware the payment is derived from charitable funds. The *pro rata* cost of production in such workshops would, it is clear, be greater than in private factories working normally, but the lower rate of remuneration would compensate for this. Thus, whilst Government stores would be obtainable from them at approximately the same cost, such emergency workshops should be self-supporting.

The initiation of such a scheme for the solution of this acute and distressing problem would require much careful thought, and I had hoped to have been able to direct attention to some example beyond our shores which would have assisted in this regard, but so far I have been unable to find evidence of the matter having been successfully dealt with. It was with much satisfaction I read the annexed statement made by Mr. John Richardson, M.I.C.E., in connection with his elaborate scheme of national education: 'Every common trade in Amsterdam has a Government shop, at which deserving people are given work in case of necessity. The price paid them is small, and the

goods made are used by the Government instead of being sold. The system is said to work very satisfactorily.'

If this were the case, then truly the trouble would have been exorcised. Its importance prompted me to trouble His Britannic Majesty's Consul at Amsterdam to send me full particulars of the working of the system, and I cannot do better than insert here Mr. Robinson's courteous and lengthy reply :

'BRITISH CONSULATE, AMSTERDAM,
'*October* 17, 1904.

'DEAR SIR,—In reply to your favour of the 14th inst., I beg to state that no such institution as that to which you refer exists in this city.

'We are no nearer to any real solution of this perennial enigma than other places. Numberless efforts have been made, and are still in progress, to provide work for the unemployed, but all these projects have been more or less failures, from various apparently irremovable causes. Even where the remuneration for such charitable work is only slightly beneath the ordinary rate of wages for men in steady and regular employment, it seems nearly impossible to get men to give honest work where it is provided from a charitable source, and repeated failures and disillusionments have made even the most well-disposed very sceptical. Perhaps the climax of absurdity was reached in the strike period of last year. A society of private benevolent individuals had formed an association in their own circle, which was to provide work for men who from old age or other causes were past heavy work, by finding light jobs for them in their own circle, paying them a *regular weekly wage*. In the midst of the strike epidemic which raged here last year, these half-crippled men *struck* for a higher rate of wages ! a consequence of which was the immediate dissolution of the benevolent association.

'The Salvation Army, which has a large and energetic establishment here, does a good work among the destitute casuals, and tries to dispose of the small products of their labour (firewood, chips, etc.), with some success. But this is not the class of work to which you refer, which I take to be the provision of work for labourers temporarily out of employment. It is apparently almost impossible to avoid the existence of such surplus labour from time to time, for obvious reasons ; and the shape in which the necessary relief should be provided in such cases is quite as great a difficulty here as elsewhere.

'I am, dear Sir, very truly yours,
'W. C. ROBINSON,
'*H.B.M. Consul.*'

From this it will be seen the desideratum has not been fulfilled in regard to Holland, and, as far as I know, it remains to be solved in regard to all great towns. I believe it to be soluble, however, by such a system as I propose, seeing that it would differ principally in magnitude only from the work of the Church and Salvation Armies, but it would possess an essential

element of success in the fact that it *would not be confined to almost unremunerative processes,* and would have the great advantage that such relief workshops would be equipped with all necessary machinery, plant and appliances for the efficient and economical carrying on of the work of national reproduction. I would venture to direct early and earnest attention to the matter, which to-day pauperizes thousands who need not be pauperized, inflicts unfair burdens on honest workers, and a severe drain upon national resources.

APPENDIX IV. TO CHAPTER V.

SUGGESTION FOR RULES AND REGULATIONS OF THE [ ] WORKING-MEN'S GARDENS ASSOCIATION.

1. THE Association shall be called 'The Working Men's Gardens Association,' and shall consist of honorary and ordinary members.

2. The object of the Association shall be to provide allotments suitable for gardens for its members, and to promote the cultivation of fruits, vegetables, and flowers by the members on such allotments. For these purposes the Association shall lease or otherwise acquire land, and sub-let it to the members.

3. The Office-Bearers shall consist of a President, a Secretary, and a Treasurer, all of whom shall be elected at an Annual General Meeting.

4. The General Committee shall consist of the Office-Bearers and six other members, who shall be elected by and from the general body of members at the Annual General Meeting. These members will all retire annually, but shall be eligible for re-election. The Committee shall have power to fill up any vacancies which may occur during the year. Any member of the Committee absenting himself from three meetings in succession, without explanation given when required by the Secretary, shall cease to be a member of the Committee.

5. The General Committee shall have the entire management of the property, funds, and affairs of the Association.

6. Those who apply for admission into the Association must be recommended by two members of the Association, and applications shall be disposed of by the Office-Bearers and Committee for the time being. The entrance-fee shall be: for honorary members, 5s.; for ordinary members, 1s.

7. Each member on his admission to the Association shall contribute the sum of his entrance-fee to the funds of the Association, and shall sign the roll of membership and the rules and regulations of the Association. Until he has signed the roll and the rules and regulations, he shall not be entitled to the privileges of membership.

8. On the admission of a member he shall be entitled to have a piece of the ground leased by the Association allotted to him at such rent as the Association may fix, and will be entitled to receive two keys for the gates admitting to the said ground on payment of deposit fixed for same, which deposit will be returned to him on his ceasing to be a member of the Association and on his delivering up the keys to the Secretary, which must be done on the expiry of his tenancy.

9. The Annual General Meeting of the members of the Association shall be held in the month of September to receive the Secretary's and Treasurer's reports, and for the election of Office-Bearers and Committee for the ensuing year, and to transact such other business as the Committee may lay before the meeting. Intimation of the place and date fixed by the Committee for the said meeting shall be sent along with the printed balance-sheet to each member by the Secretary through the post-office at least fourteen days before the meeting. Special General Meetings of the Association shall only be called on a request by one-third at least of the members being sent to the Secretary.

10. The General Committee will meet on the last Tuesday of each month, at eight o'clock p.m., in the committee-room or such convenient place as may be arranged by them. All communications or business to be brought before the Committee must be lodged with the Secretary not later than on the Saturday previous to the meeting at which the same is to be considered.

11. All moneys belonging to the Association shall be lodged in the Savings Bank, or other bank, or one of its sub-offices, as may be determined by the office-bearers in Committee, in the names of the President and Treasurer of the Association for the time being. All cheques must be signed by the President and Treasurer.

12. The President shall preside at all meetings of the Association and of the Committee. If the President be absent, any member who may be elected by the majority of the members present shall take the chair, and shall thereby become vested with the powers of President. The President shall have a casting as well as a deliberative vote.

13. The Secretary shall attend every meeting of the Association and the Committee, take minutes of the proceedings, and keep the roll of members and minute-book, and generally do everything in relation to his office as is usual or known to belong thereto. The Secretary shall have the custody and care of the whole records and documents belonging to the Association, and all books and papers with the exception of those of the Treasurer, and on the expiry of his term of office shall deliver up the same to his successor in office or to such other person as the Committee may appoint.

14. The Treasurer shall collect and manage the funds of the Association, pay the debts due by the Association, and shall submit at each monthly Committee meeting an account of his intromissions with the said funds during the previous month. Accounts incurred by the Association shall be paid after the Committee have examined and approved of the same. At the Annual General Meeting of the Association the Treasurer shall submit his accounts for the previous year, with a balance-sheet showing the financial position of the Association.

15. The piece of ground rented by each member shall be allotted at the term of Christmas in each year, and shall be held by the member for one year from that term, *subject to conditions of lease referred to in Rule* 19.

16. The rent to be paid by the members for the pieces of

ground allotted to them must be paid by them as follows: The rent for the half-year from Christmas to Midsummer shall be due and payable upon the last Saturday in January, and the rent for the half-year following, from Midsummer to Christmas, shall be due and payable upon the first Saturday in July thereafter.

17. Members failing to pay rent due by them to the Treasurer within three weeks after the date upon which such rent falls due shall be fined 6d., and such members shall be fined 6d. for every week thereafter the rent remains unpaid.

18. In the event of a member wishing to give up his allotment, he must give written notice to the Secretary six months before the term of Christmas, and should the Association wish to remove any tenant at the expiry of his year's lease, six months' notice also must be given in writing to such tenant by the Secretary of the Association.

19. The Association reserves the power to deprive any member of his allotment, should the landowner or superior require said allotment or ground for feuing or any other purpose, on giving three months' notice of their intention; and he must remove at the expiry of said notice, and shall have no claim to any compensation, unless the notice expires in the months of May, June, or July. The Treasurer will pay to such member 1s. for each pole of ground rented, as compensation for the ground demanded by the superior landlord under conditions of the lease.

20. Members shall be at liberty to erect greenhouses or summer houses or other buildings, including fences, on their allotments, provided they previously obtain the sanction and approval of the Committee to the plans for same.

21. Erections on allotments must not exceed the following dimensions:

GREENHOUSES.

Span-roofed greenhouses shall not exceed 13 feet* in length of back wall, nor 6 feet in height of side wall, nor 9 feet in height of

* In some Associations the limit is 20 feet.

apex. Shed-roofed greenhouses shall not exceed 13 feet in length nor 8 feet in height of back wall.

Summer-houses shall not exceed 13 feet in length of back wall, 6 feet in height of side wall, nor 9 feet in height of apex on north boundary, but the height of such erections may be increased to the extent of 9 inches for every 3 feet south of that boundary.

FENCES AND ROADWAYS.

Suitable fences must be erected next to the common roadways, but must not exceed 3 feet 6 inches in height.* When fences are erected between allotments they shall not be more than 2 feet 6 inches high, and must be of wire fencing or open spar, or spar and space work. No close fences shall be allowable.

All common roadways on the grounds of the Association must be at least 3 feet wide, and no member shall be allowed to grow bushes, trees, or shrubs that overhang roadways or neighbouring allotments.

22. Each member must cultivate his allotment, and keep it tidy and clean and free from weeds; and keep in good order and repair, to the satisfaction of the Committee, his share of the roadways skirting his allotment.

23. No member shall keep swine, rabbits, pigeons, bees, poultry, or any live stock of any description upon his allotment, and no dog will be allowed in the gardens except on leash.†

24. No member shall be allowed to sub-let or transfer his allotment, or any part thereof, to any person whatsoever, but any member wishing to resign his membership during his tenancy of an allotment may have his allotment transferred to any person named by him, on such person being approved of by the Committee; and members wishing a transfer from one allotment to another will be charged 1s., the same as a new member.

25. Members must not give the keys of the gardens to their children if under twelve years of age, nor to any stranger; but members may bring such children or visitors to the gardens, providing they

* In some instances this is 4 feet.

† This clause would probably be modified in England.

do not leave them there, but see them out of the gardens. On leaving the grounds members must lock the entrance gate.

26. Any member shall have power to take keys of the gardens from children or strangers and hand them over to a member of Committee, and the owner of such keys shall not obtain the same until he has paid a fine of 1s. to the Treasurer.

27. Any member who shall be within the said gardens while under the influence of intoxicating liquor, or having intoxicating liquor in his possession, or shall buy or sell fruits, vegetables, or flowers in said gardens upon a Sunday, or shall be convicted of any criminal offence, or shall trespass upon the allotment of any other member, or shall behave in a riotous or unseemly manner to the annoyance of other members, or who shall have infringed any of the foregoing rules and regulations, shall be deemed to have forfeited his allotment, and may be ejected under Rule 19, but no member shall be ejected without the sanction of the Committee. Any proposed ejectment must be brought up by the Committee and discussed at the Annual General Meeting of the Association, or at a Special General Meeting called for the purpose.

28. The President shall call a Special General Meeting of the members of the Association on a requisition signed by ten members, said requisition to state for what purpose the meeting is to be called.

29. When a tenant quits or is ejected from an allotment, any greenhouse, summer-house, or other erection belonging to him must, unless purchased or taken over by an incoming tenant, be removed without the grounds of the Association; and no rubbish —as broken glass, bricks, or anything that would interfere with the digging and cropping of an allotment—is to be left by any outgoing tenant, otherwise he will be held responsible for any expense incurred by the Association in the removal of such rubbish. In the case of ejectment for an offence, the buildings or crops of such ejected members shall be forfeited to the Association, if the Committee shall so rule.

30. Members infringing the foregoing rules and regulations

shall be liable, on a vote of a majority of two-thirds of the members of Committee present at any Committee meeting, to forfeit their allotment at the first Christmas term, but members feeling themselves aggrieved may appeal, if supported by nine other members, who shall requisition the President to call a Special General Meeting in accordance with Clause 28.

Lace-making in Switzerland.

(Drawn by Harold Percival from the description given in 'Across the Great St. Bernard.')

CHAPTER VI

GARDEN CITY INDUSTRIES

'The most exquisite and the most expensive machinery is brought into play where operations on the most common materials are to be performed, because these are executed on the widest scale. This is the meaning of the vast and astonishing prevalence of machine-work in this country: that the machine, with its million fingers, works for millions of purchasers, while in remote countries, where magnificence and savagery stand side by side, tens of thousands work for one.'—WILLIAM WHEWELL, D.D.

IN the industrial development of a country there is perhaps no more interesting point to note than the manner in which towns sprang into being and specific industries identified themselves with individual towns. The dense smoke clouds—the 'flags of commerce,' as they have been so aptly called—now float over vast engineering cities in place of the blue wisp ascending from the isolated forge of the swarthy smith, the memory of such alone serving to mark the site of to-day's congested factories, of to-day's din, of the incessant diurnal roar

and nocturnal glare of our times. The sinew-delivered blows of the sturdy ironsmith still resound in the vulcanic thuds of Antæan steam-hammers, dealing blows that make the very earth to tremble.

The tall and slender chimneys of textile towns now rear themselves high above the lofty, many-storied steam-driven weaving-mills, marking the site where the shuttle's rattle was first heard 'neath the lane-side lowly roof of the hand-loom weaver, blending woof and weft in silent isolation. The animation and the clatter of the shipyard, wherein the leviathan knight—to the tune of myriad hammerings—girds on his steel armour and glides seawards to perform his crusades of commerce, mark the sites where, erstwhile, the solitary shipwright plied his adze.

No less interesting is the manner in which the 'staples' of our now great centres of industry came originally to be implanted upon their sites. The hand-spinning of cotton yarn was probably not more general in Lancashire than in any other county of England, for, indeed, it was to be witnessed in every household; but because a few men of that county—men entirely without means, and ofttimes put to the greatest straits to obtain a few extra pence for their experiments—set themselves, with the utmost and most laudable perseverance, to replace the hand process by mechanical operations—both in regard to spinning the yarn and weaving the cloth—the Palatine county brought forth the

cottonopolis of the Empire.* What a contrast! How intensely interesting the retrospect!

Sheffield might have remained a quiet village beside the murmuring Sheaf and rippling Don had not Benjamin Huntsman invented, and subsequently introduced to the spot, the manufacture of cast steel. What was it before? A struggling townlet engaged in the making of the 'Sheffield whittles' spoken of by Chaucer. As late, indeed, as the middle of the eighteenth century it was 'a mean place; the cutler was a poor man, and an income of £100 a year was accounted riches.' What is it now? Contrast, indeed, the crowded hive of workers, submerged beneath an eternal pall of black smoke, with the countryside of the inceptive cutlery industry—the time when the Don, the Loxley, the Rivelin, the

* James Hargreaves, an untaught weaver, who contrived the first 'carding-engine' about 1760, lived near Church (Lancashire). Six years later he invented the 'spinning-jenny.' 'Barber Arkwright, who invented the 'spinning-frame,' was born at Preston (1732). Richard Kay, originally a clockmaker of Warrington, went to Preston and joined Arkwright in his venture. Samuel Crompton, inventor of the 'spinning-mule,' was born near Bolton. 'His discovery gave a wonderful impulse to the industry, and consequently to the wealth and population of South Lancashire, causing its insignificant villages to attain the importance of large and populous towns.' Robert Peel, the inventor of calico-printing, was born at Bury. Although not Lancashire men, one cannot refrain from mentioning the names of William Lee, inventor of the stocking-frame (born near Nottingham), and Dr. Cartwright, inventor of the power loom (also born in Nottinghamshire).

Porter, and the Sheaf—which Ebenezer Elliott wrote of as 'the five fingers of a hand'—supplied the whole of the power required. For they were but called upon to trundle the primitive wheels of the pigmy streamside workshops, where ever and anon along their length the whizz of the grinding-stone could be heard, and the moaning roar of the small forges.

Similar conditions exist in Germany to-day. There also we may find a land of deep, winding valleys, wood-clad, and dotted with picturesque villages and old-fashioned inns. Running water everywhere, and tucked away among the hills artificial but charming lakes of blue, made by damming up the valleys to form mill-ponds, the power obtained from these explaining why the district has been chosen for the cutlery industry. Such lovely valleys are, in fact, a series of little rural factories, extending for miles, the one below the other, each deriving its requisite power from the descending streams.

Picture, if we can, the clear and sparkling Irwell wending its way through a tranquil and verdant valley. What a transformation were its banks destined to see! To-day it winds its black and befouled body through interminable walls in 'the acknowledged centre of the most extensive manufacturing district in the world'—a centre so overgrown that, in its turn, it has become surrounded by a ring of populous suburban townships, formed from the overflow of its own population; these

again encircled by a second zone of densely-packed manufacturing towns, with populations ranging from 10,000 to 50,000 souls. Yet in 1800 its own population did not greatly exceed that of its more fully-grown children of to-day. To-day it contains and supports a population of half a million. As late as 1724 it is thus described by Dr. Stukeley: 'The largest, most rich, populous, and busy village in England. Here are about 2,400 families, and their trade, which is incredibly large, consists of fustians, tickings, girth-webs, and tapes, which are dispensed all over the kingdom and to foreign parts. They have looms which work twenty-four laces at a time, stolen from the Dutch, and on the same river for the space of three miles there are sixty water-mills.'

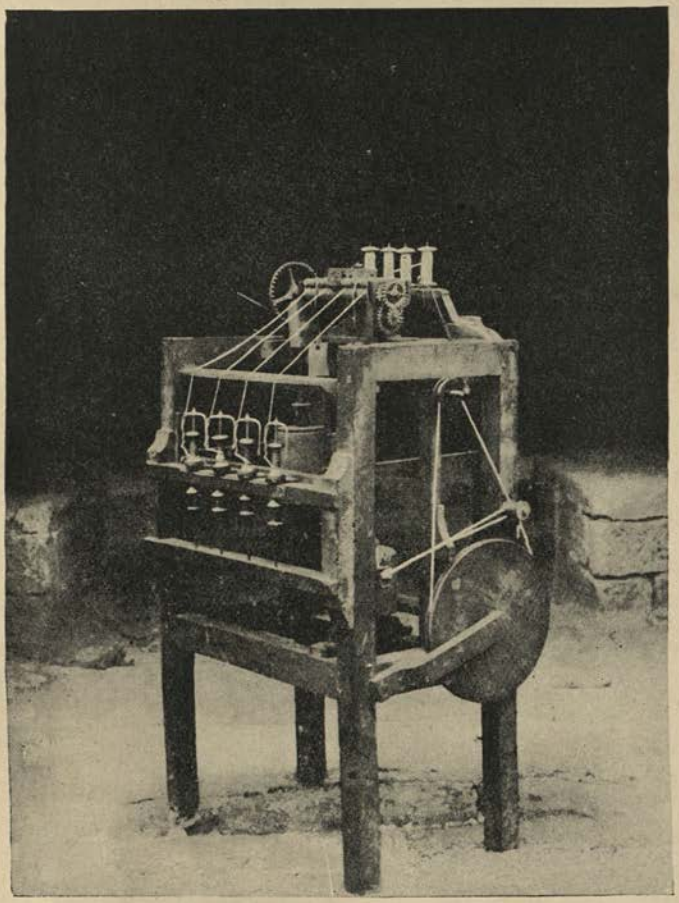
What is it we picture in the maze of 'mules' travelling to and fro? what in the spinning-frames, with their myriad whirling spindles? Truly a wondrous, ever-changing phantasmagoria springs to the mental vision of the student of industrial evolution. The ever-lengthening thread conjures up for him the squalid interior of the shop of the ingenious barber of Preston; there he sits pondering over his want of success with his yarn-lengthening rollers. So assiduous, so prolonged his persevering efforts, he reduced himself to abject poverty. In the gradually-swelling flying bobbins one sees the unrewarded labours of poor Hargreaves merging into the wondrous epicyclic

combinations of that mechanical genius, Richard Roberts, who had trudged many a weary mile, footsore and almost penniless, to the busy city, destined to revolutionize its intricate machinery.

Sad and soul-inspiring, the pictures run by! In the rattle of the flying shuttles, in the roar and rumble of the rolling masses, what is it he hears? He hears the shrieking, frenzied wife breaking into splinters the labours of her husband's days and nights.* In the racking rattle of the loom he hears the vindictive shouts of the infuriated Blackburn mob driving from his humble home the ingenious inventor of its 'fly-shuttle,' to-day, as it were with mechanical intelligence, weaving the broadcloth at a speed and price to suit it to the backs of the poorest.

As we emerge from the mills the breeze seems to turn the leaves of the book of memory, and the pictures become more cheery. As we tread the cinder-bestrewn road, a cloud of white and brightly-illumined steam is wafted towards us from the dye-houses and calico-printing sheds, and in this we see the industrious yeoman, father of a large family, striving to find new and better employment

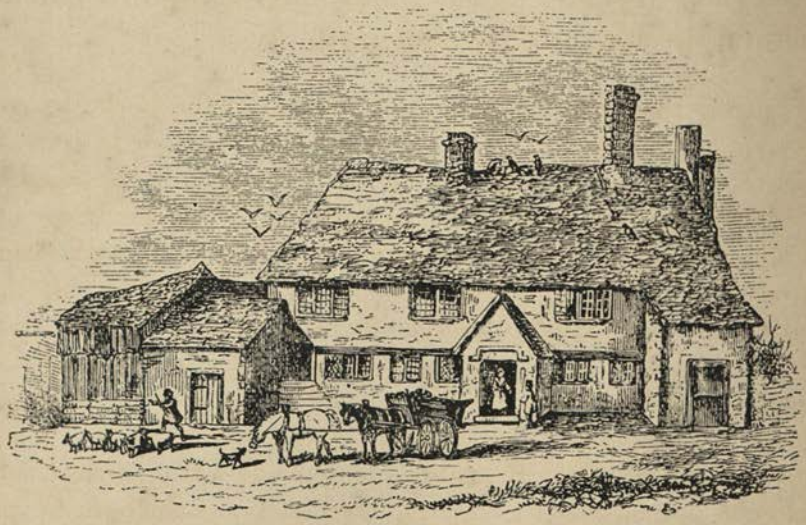
* Arkwright's wife became impatient at what she concluded to be a wanton waste of time and money, and in a moment of sudden wrath she seized upon and destroyed his models, hoping thus to remove the cause of the family privations. Arkwright, however, was a stubborn and enthusiastic man, and he was provoked beyond measure by this conduct of his wife, from whom he immediately separated.—DR. SMILES.



Richard Arkwright's Original Spinning Frame.

(Illustration kindly lent by F. C. Arkwright, Esq.)

Birthplace of a Great Industry : the embryo Pottery of Joshua Wedgwood at Etruria.



'Parsley Peel's' House, where Calico Printing was Invented.

for his sons and daughters—silently and stealthily, and with the assistance of the womanfolk of his long, low farmhouse, who busily iron for him the calico upon which he experiments, we see him thoughtfully engaged, his face radiant with the elation of success suddenly achieved.*

The rolling, seething cloud seems to turn to us yet another picture. It is that of the young and handsome son—perfecter of his father's inventions—returning from his hard day's work at the linen 'ground,' and gazing studiously into the glowing embers, with the little daughter of his landlord partner upon his knee, prettily prattling of becoming his wife. Another circumfusion of the tumbling steam-cloud, and we see him a great statesman—the Prime Minister of England—his companion, still faithful, by his side.†

* It was then customary, in such houses as the Peels', to use pewter plates at dinner. Having sketched a figure or pattern on one of the plates, the thought struck him that an impression might be got from it in reverse, and printed on calico with colour. In a cottage at the end of the farmhouse lived a woman who kept a calendering machine, and going into her cottage he put the plate with colour rubbed into the figured part and some calico over it through the machine, when it was found to leave a satisfactory impression. Such is said to have been the origin of roller printing on calico. Robert Peel shortly perfected his process, and the first pattern he brought out was a parsley leaf; hence he is spoken of in the neighbourhood of Blackburn to this day as 'Parsley Peel.'—DR. SMILES.

† The little daughter of Robert Peel's partner, William Yates, was named Ellen, and she soon became an especial favourite with

Of such pioneers in industry, how faithful and redolent of truth are the words of Macaulay: 'Men there have been, ignorant of letters, without art, without eloquence, who yet have had the wisdom to devise and the courage to perform that which they lacked language to explain. Such men have worked the deliverance of nations and their own greatness. Their hearts are their books; events are their tutors; great actions are their eloquence.'

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the young lodger. On returning from his hard day's work at 'The Ground,' he would take the little girl upon his knee and say to her, 'Nelly, thou bonny little dear, wilt be my wife?' to which the child would readily answer 'Yes,' as any child would do. 'Then I'll wait for thee, Nelly; I'll wed thee and none else' And Robert Peel did wait. As the girl grew in beauty towards womanhood, his determination to wait for her was strengthened, and after the lapse of ten years—years of close application to business and rapidly increasing prosperity—Robert Peel married Ellen Yates, when she had completed her seventeenth year, and the pretty child, whom her mother's lodger and father's partner had nursed upon his knee, became Mrs. Peel, and eventually Lady Peel, the mother of the future Prime Minister of England. Lady Peel was a noble and beautiful woman, fitted to grace any station in life. She possessed rare powers of mind, and was, on every emergency, the high-souled and faithful counsellor of her husband. For many years after their marriage she acted as his amanuensis, conducting the principal part of his business correspondence, for Mr. Peel himself was an indifferent and almost unintelligible writer. She died in 1803, only three years after the baronetcy had been conferred upon her husband. It is said that London fashionable life—so unlike what she had been accustomed to at home—proved injurious to her health; and old Mr. Yates afterwards used to say, 'If Robert hadn't made our Nelly a "Lady," she might ha' been living yet.'

A bright corner of this flocculent flag of commerce now rolls over, and we see the erstwhile wife-denounced barber-inventor, the despised of fellow-workers, now the benefactor of them all, as he kneels at the feet of his Sovereign. We see with inward satisfaction the radiance of delight, the all-forgiving smile, suffuse the careworn features at the well-earned words, 'Arise, Sir Richard Arkwright.'

> 'So Arkwright taught from cotton-pods to cull
> And stretch in lines the vegetable wool;
> With teeth of steel its fibre knots unfurl'd,
> And with the silver tissue clothed the world.'
>
> DR. ERASMUS DARWIN.

Picture the meandering Rea and Tame, and the dreary moors and scrubby heaths environing their banks. There, slowly making their way through the rising mists, a coterie* of venerable forms

* About this time, it would seem, the neighbourhood of Birmingham was remarkable for the number of kindred spirits, all devoted to the pursuit of natural knowledge and filled with mutual esteem and affection, who there found profitable pleasure in each other's society, all of them luminaries well worthy to revolve around Boulton and Watt as fixed planets, but also shining with more than merely reflected light. 'I cannot refrain,' says Edgeworth, 'from noticing the great variety of intellect which they possessed. Mr. Keir, with his knowledge of the world and good sense; Dr. Small, with his benevolence and profound sagacity; Josiah Wedgwood, with his unceasing industry, experimental variety, and calm investigation; Boulton, with his mobility, quick perception, and bold adventure; Watt, with his strong inventive faculty, undeviating steadiness, and unbounded resource; Darwin, with his imagination, science, and

engaged in earnest conversation. And well they might be, for one of their number had invented the

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poetical excellence; and Day, with his unwearied research after truth, his integrity and eloquence—formed altogether such a society as few men have had the good fortune to live with, such an assemblage of friends as fewer still have had the happiness to possess and keep through life.'

This learned coterie had its fraternizings ofttimes enlivened by merry sallies from the lips of the vivacious Boulton; but the sparkles of true wit scintillated about the person of Dr. Erasmus Darwin. Here is a sample written in the recesses of his practitioner's chaise, which, indeed, must have been a wondrous 'equipage,' presenting a queer contrast to the elegantly equipped 'turn-out' of the present-day physician; for, we are told, 'the chaise,' which was worn and mud-bespattered externally, had room for the doctor and his appurtenances only internally. On one side of him was a pile of books, reaching from the floor to nearly the front window of the carriage, while on the other was a hamper containing fruit and other comestibles with which he regaled himself during his journey. Lashed on to the place usually appropriated to the boot was a large pail for watering the horses, together with a bag of oats and a bundle of hay. Such was the equipage of a fashionable country physician of the last century, and thus wrote its owner in excusing himself from attending one of the meetings of the Lunar Society (April 5, 1778):

'DEAR BOULTON,

'I am sorry the infernal divinities who visit mankind with diseases, and are therefore at perpetual war with doctors, should have prevented my seeing all your great men at Soho to-day. Lord, what inventions, what wit, what rhetoric, metaphysical, mechanical, and pyrotechnical, will be on the wing, bandied like a shuttlecock from one to another of your philosophers! while poor I, I by myself, I imprisoned in a post-chaise, am joggled and jostled and bumped and bruised along the King's highroad, to make war upon a stomach-ache or a fever.'

steam-engine—he of the noble brow and thoughtful mien—and another, replete of enterprise, had promised to build it—he of the curling white locks and benevolent visage. They are the 'Lunar Society'! Well-chosen name, seeing that they must needs meet to confer at each others' houses at 'full moon,' the better to wend their way homewards, as we, in fancy, see them. Picture the change these two men have wrought—the one James Watt, the other Matthew Boulton. Picture rising from those moors and heaths the city of Birmingham; for was not its birth-cry heard with the first throb of the inanimate child and servant of man?

'Ha, Boulton,' cries King George III., 'it's long since we've seen you at Court! Pray what business are you *now* engaged in?' 'I am engaged, your Majesty, in the production of a commodity which is the desire of Kings.' 'And what is that? what is that?' quoth the King. '*Power*, your Majesty,' replied Boulton; and thereupon proceeded to give a description of the great uses to which he felt the steam-engine might be applied. Yet, with all his determined enterprise, with all the buoyant hopefulness of his nature, could Matthew Boulton then

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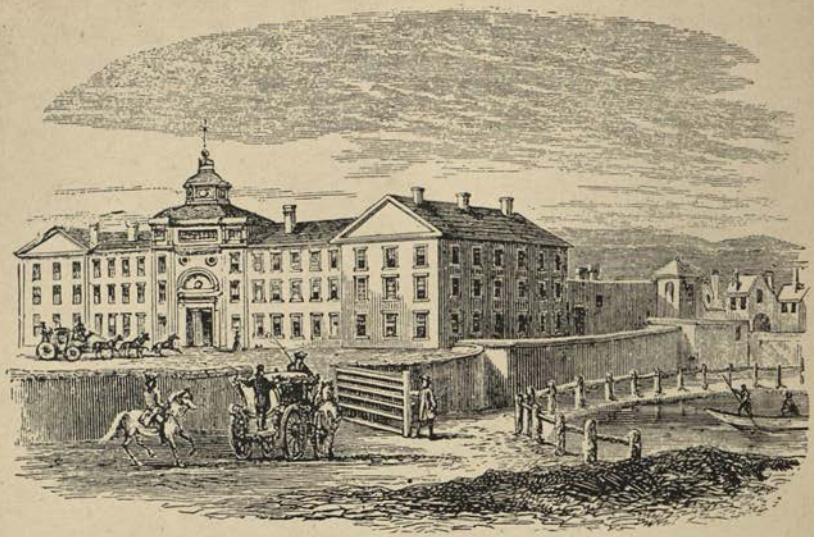
The versatility of the man, moreover, is evinced if we read his poetry—poetry at once studied, serious, and prophetic. Was ever a more prophetic verse written than Darwin's, commencing:

'Soon shall thine arm unconquered steam afar,
Drag the slow barge and drive the rapid car.
. . . . .'?

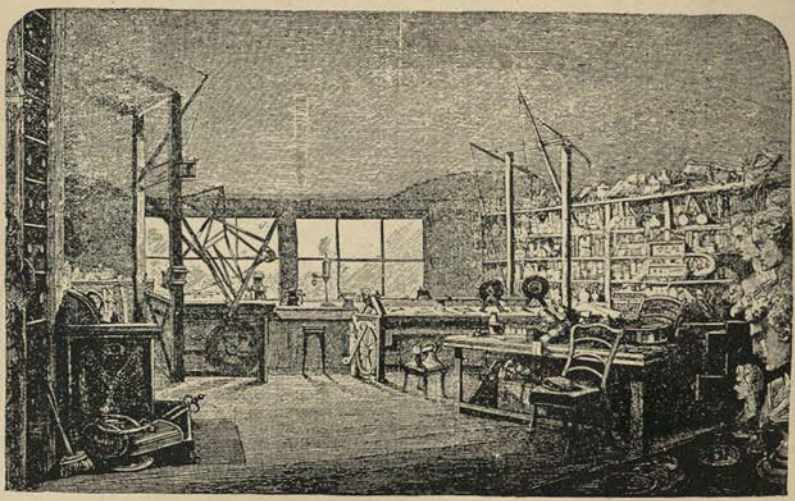
have foreseen more than a fraction of the industrial revolution the wheezing, pounding thing—of iron thews and brazen sinews—sluggishly reciprocating within his works* was prepollent and destined to bring about?

Necessity is, proverbially, the mother of invention! It is therefore very interesting to find that want of water-power formed the incentive to Matthew Boulton to direct his inventive faculties upon the steam-engine. One of the great defects of Soho as a manufacturing establishment was shortness of water motive-power. For a long time Boulton struggled with the difficulty; he managed in the winter, but during summer droughts he was obliged to reinforce the power of this water-wheel. His

* Matthew Boulton, a man of great enterprise and administrative ability, as well as being imbued with an ample quantum of British pluck, was the repository for the confidence of a large circle of friends; and of these, some occupied exalted places. Previously to his becoming interested in the steam-engine, he had not only carried on a very extensive business, fulfilling large contracts for the minting of coinage for this and other countries, but he produced many articles of *vertu*, principally in bronze and ormolu. Subsequently, he gave himself up entirely to the manufacture of the steam-engine. The building in which all this occurred and the steam-engine had its birth is shown in the illustration. In my opinion the halo surrounding the personality of this great man has always been allowed to be somewhat unduly eclipsed by the *éclat* of the greater with whom he so beneficially collaborated, and helped with such astonishing courage, heroic enterprise, and self-sacrifice. (More concerning him will be found in 'Horseless Road Locomotion,' by the author.)

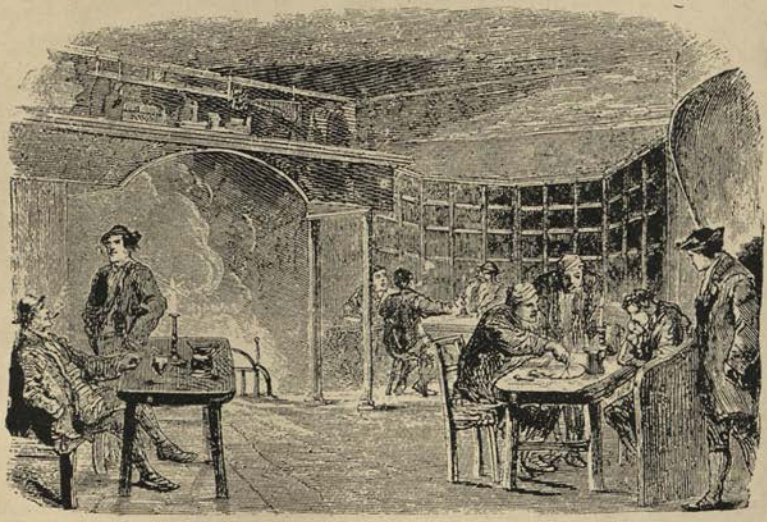


Matthew Boulton's Mint at Soho, Birmingham, where the First Steam Engine was built.



James Watt's Laboratory in the Garrett of Heathfield House, Birmingham.

The Hall i' the Wood, near Bolton, where Hargreaves surreptitiously worked at and hid his 'Spinning Jenny.'



The Parlour of the 'Waggon and Horses,' Handsworth Heath, where the description of the Crank was overheard, compelling Watt to invent his 'Sun-and-Planet' Motion.

auxiliary power consisted of from six to ten horses, and he obtained it at an expense of from five to eight guineas a week. This expedient, in addition to being costly, was found very inconvenient.

Boulton therefore turned his thoughts towards steam, with the idea of erecting a pumping-engine, after Savery or Newcomen's construction—the only one then known. This he intended to use for the purpose of raising the water from the mill-stream ('tail-race'), and returning it back to the mill-pond, by which means he could maintain sufficient head and volume of water to supply the water-wheel continuously, and thus keep the establishment in regular work. 'The enormous expense of the horse-power,' he wrote to a friend, 'put me upon thinking of turning the mill by fire, and I made many fruitless experiments on the subject.

Matthew Boulton had many friends and moved in Court circles. There, doubtless, he had met the American envoy, for in 1766 we find him engaged in a correspondence with the distinguished Benjamin Franklin concerning steam-power. Eight years previously, it would appear, Franklin had visited Boulton's establishment at Birmingham, and the host and visitor were mutually pleased with each other, and continued to correspond during Franklin's stay in England, exchanging their views on magnetism, electricity, and other subjects. This being the case, it was natural that when Boulton began to study the 'fire'-engine with a view to its improve-

ment, Franklin should have been one of the first whom he consulted. Writing to him on February 22, 1766, Boulton said:

'My engagements since Christmas have not permitted me to make any further progress with my fire-engine; but, as the thirsty season is approaching apace, necessity will oblige me to set about it in good earnest. . . . My thoughts about the secondary or mechanical contrivances of the engine are too numerous to trouble you with in this letter, and yet I have not been lucky enough to hit upon any that are objectionless.'

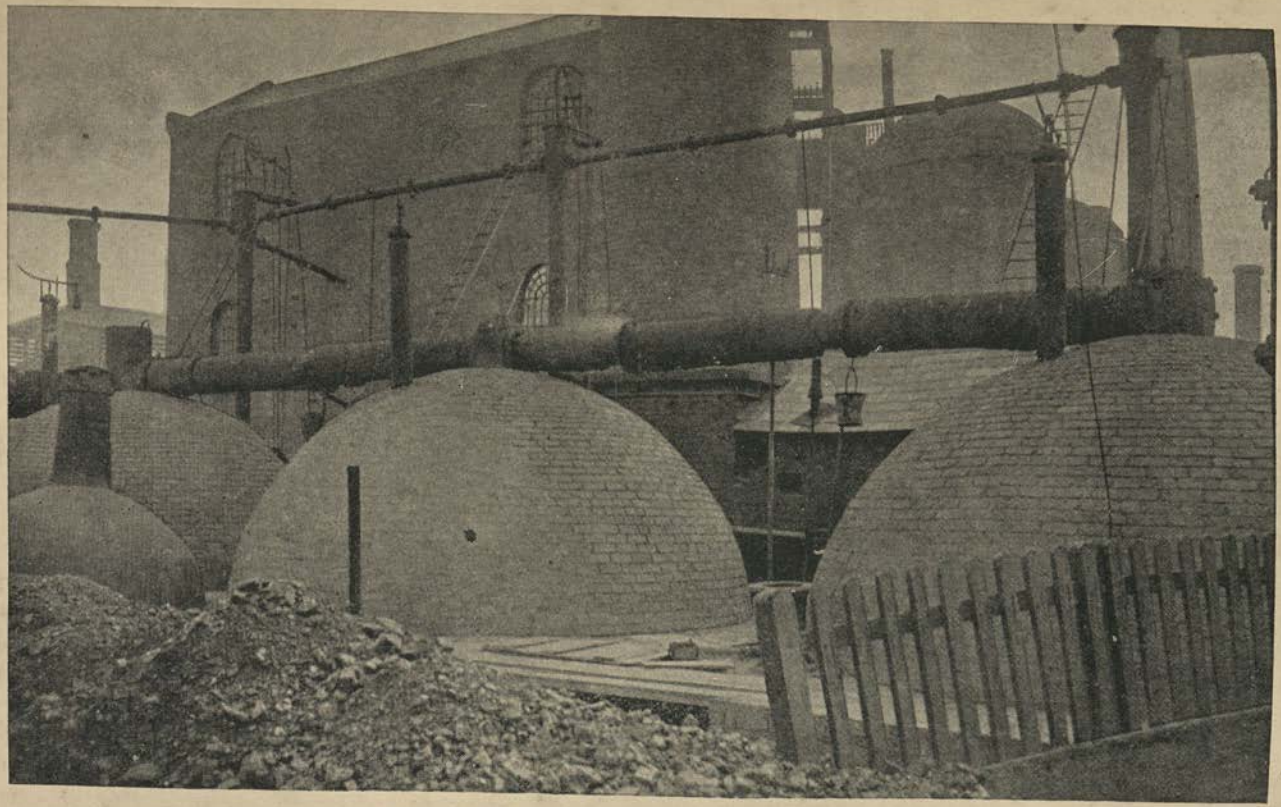
I mention this because it is popularly supposed that it was James Watt who first drew Matthew Boulton's attention to the steam-engine as a thing from which motive-power could probably be obtained. Up to the time of which we are now speaking, it must be remembered, the only function the steam-cylinder had performed had been that of water-raising. That Boulton was himself a genius is usually overlooked, yet this is undoubtedly the fact. We find, for example, such a great philosopher and electrician as Benjamin Franklin concluding a letter to him (date 1765) with the words: 'If anything new in *magnetism or electricity, or any other branch of natural knowledge,* has occurred to your *fruitful genius* since I last had the pleasure of seeing you, you will, by communicating it, greatly oblige me.'

Hence, we are not surprised to find that this enterprising and indefatigable man actually constructed a model of a steam-engine with which to

make his experiments preliminary to carrying out the motive-power idea to which I have referred. It is, moreover, interesting to observe that both the partners-to-be were engaged in the same occupation, yet unknown to each other; for we are now speaking of the year 1766. This model was sent to London for Franklin's inspection, and must have been exhibited to others. For we find, on its return to Birmingham, Boulton experimenting with it, and his boon companion, Dr. Erasmus Darwin—of whom we have already heard—writing him from Lichfield for news of it, and of Franklin's suggestions, if any, for its improvement. In one of his letters (March 11, 1766) the versatile Æsculapius writes: 'Your model of a steam-engine, I am told, has gained so much approbation in London that I cannot but congratulate you on the mechanical fame you have acquired by it, which, assure yourself, is as great a pleasure to me as it could possibly be to yourself.' Darwin himself was a man of ideas, though we have no evidence that in things mechanical he was imbued with genius of practical *genre*, and therefore, in these days of introduction of the 'motor-car,' I cannot resist the temptation to mention that, in another letter to Boulton, Darwin lays before the mechanical philosopher his scheme for the building of a *fiery chariot* which he had conceived; in other words, a locomotive steam-carriage (this half a century before Stephenson's time!). He proposed to apply an engine with a pair of cylinders, working alternately,

to drive the proposed vehicle, and he sent Boulton some rough diagrams illustrative of his views, which he begged might be kept a profound secret, as it was his intention, if Boulton approved of his plan and would join him as a partner, to endeavour to build a model engine, and, if it answered, to take out a joint patent for it. But Dr. Darwin's scheme was too crude to be capable of being embodied in a working model, and nothing more was heard of his 'fiery chariot.'

It was not till the following year, 1767, that Boulton and Watt met. When Dr. Roebuck, of Kinneal, was occupied with his enterprise at Carron —now grown into perhaps the largest iron foundry in the kingdom—he wished Boulton to join him as a partner in opening up some coal-mines. But Boulton's hands were already full of business nearer home, and he declined the venture. Roebuck then informed him of the invention made by his ingenious friend Watt, and of the progress of the model engine. Needless to say, the subject excited the interest of Boulton—himself occupied upon it—and he expressed a desire to see Watt. In those days it was a far cry from Glasgow to Birmingham; but it happened that Watt had occasion to be in London in the summer of 1767, on business connected with the Forth and Clyde Canal Bill, and he determined to take Soho on his way home. Watt was much struck with the systematic arrangements of the Soho manufactory, and recognised at a glance the admir-



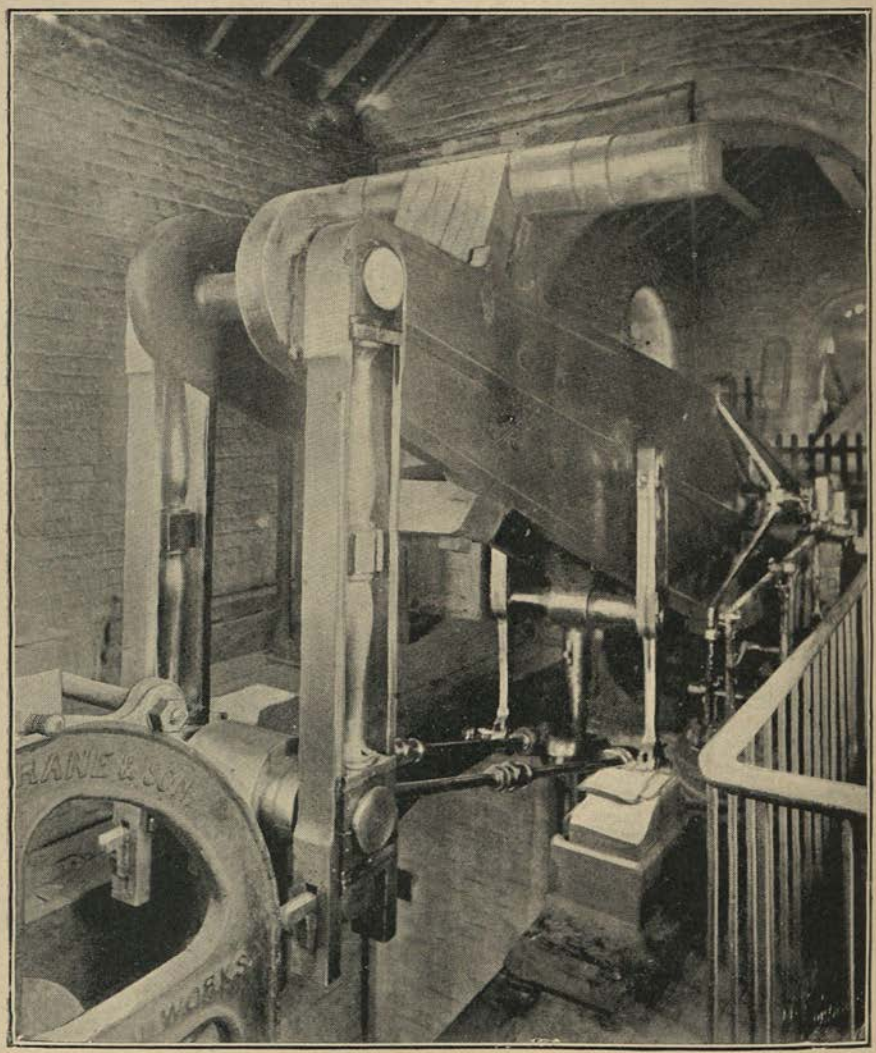
'Balloon' Boilers used in the Time of James Watt.

able power of organization which they displayed. Still plodding wearily with his model, and contending with the 'villainous bad workmanship' of his Glasgow artisans, he could not but envy the precision of the Soho tools and the dexterity of the Soho workmen. Boulton was absent from Birmingham at the time of Watt's visit, but something in the nature of an arrangement seems to have been come to by correspondence, though the two did not meet until the following year, when Watt visited London in connection with his engine patent. 'Get your patent and come to Birmingham, with as much time to spend as you can,' urged Dr. Small, who had seen Watt on his previous visit. Accordingly, Watt again took Birmingham on his way home. There he saw his future partner for the first time, and, Dr. Smiles tells us, they at once conceived a hearty liking for each other. Much conversation took place about the engine, and it greatly cheered Watt to find that the sagacious and practical Birmingham manufacturer should augur so favourably of its success as he did. Shortly after, when Dr. Robinson visited Soho, Boulton told him that, although he had begun the construction of his proposed pumping-engine, he had determined to proceed no further with it until he had ascertained the success or otherwise of Watt and Roebuck's scheme. 'In erecting my proposed engine,' said Boulton, 'I would necessarily avail myself of what I learned from Mr. Watt's conversation, but this would not now be right without

his consent.' Boulton's conduct in this proceeding was thoroughly characteristic of the man, and affords another illustration of the uniform fairness and honesty with which he acted in all his business transactions.

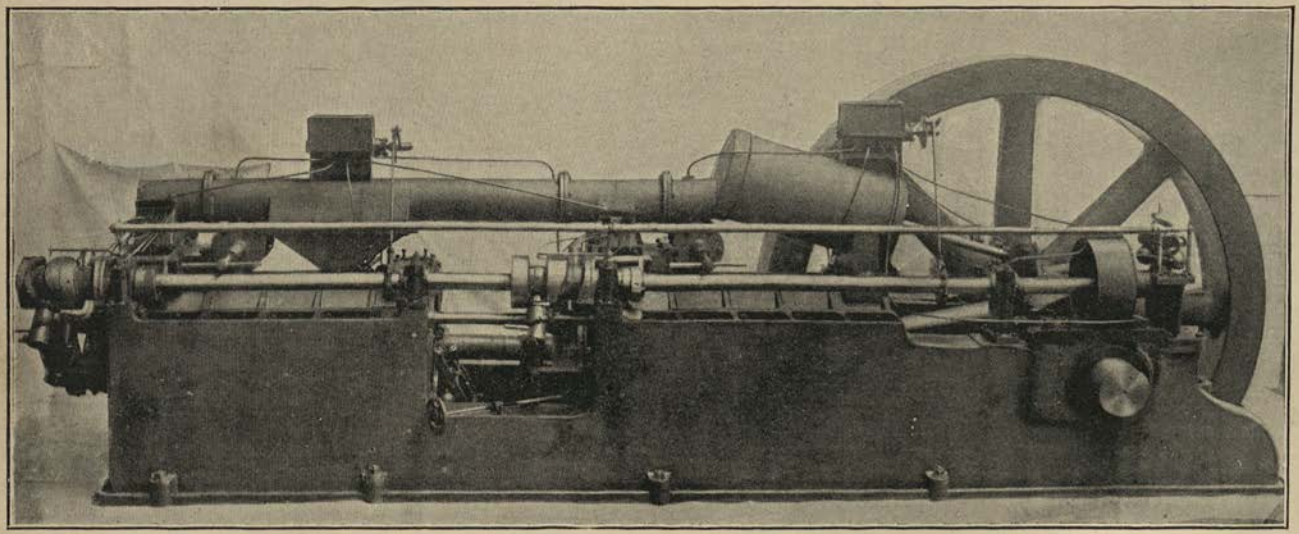
Thus commenced the mutual co-operation of science with enterprise, culminating in the displacement of animal motive-power and the introduction of an inanimate servant of man—one which has wrought an industrial change, the world over, surpassing the wildest dream. Thus became embodied in a wonder-working engine the enterprise of a far-seeing man of resource, with the pensive labours of a man of humble origin; thus was presented to the world a new form of motive-power which has made an industrial Garden City a possibility—for the stationary steam-engine was the parent of the locomotive, and the latter has made industrial towns independent of ports and rivers.

But we must not dwell upon these pleasant visions of the past, for the industrial development of a Garden City will be far removed from them—it will indeed be a thing apart; its increase of size and importance will not have to await the development of a staple industry. It will, usually, be uninfluenced by the trades peculiar to a particular district. In some instances, indeed, the industries—for the workers in which it shall provide increase of comfort and happiness—will be provided for it, as, for example, in the proposed case of a



The Old Style. View on the Gallery of a Watt Engine, oscillating about a Dozen Times a Minute, and giving about 50 Horse-power.

966 C



The New Style—an Engine working without a Boiler by Internal Combustion, and giving 500 Horse-power.

Garden City being built in connection with a naval base, and, again, in connection with the aluminium industry. Usually, however, it will derive its prosperity from mixed trades and occupations, and herein will it evince a measure of safety beyond that of 'staple' towns. For the latter are ofttimes most disastrously affected by temporary depression in their staple trade, as also by trade disputes. With work and wages dependent upon a variety of industrial operations, it is obvious such aberrations will be far less keenly felt.

In the development of the first Garden City, seeing that its avowed object is, not the mere establishment of a new town, but the alleviation of hardships and disabilities inherent to large and densely-populated cities, I am constrained to think that genuine and whole-hearted efforts should be made—in seizing upon the unique opportunity—to provide and foster new industries and occupations, such as those calculated to become of national importance, more especially if their nature should be such as to afford means of employment for the weakly, the consumptive, and the crippled. If, moreover, the *genre* of such new occupations should be such that they could be fostered and supervised by the ladies of the community, gratifying success would be still more likely to accrue.

Garden Cities are to have their ladies' leagues and apposite means of well-doing, and the carrying on of good work will doubtless emanate from them.

In this relation I should again wish to impress my views of commerce *versus* charity. The first impulse of warm-hearted woman is to *give;* the second to enlist the resources of others in the giving. Far be it from me to wish this altered, but let me impress the necessity alike of doing *permanent* good and of insuring against failure. *Giving* is not calculated to accomplish the *desiderata.* By its very nature its aid is only likely to be of a temporary nature, and if through any lack of either funds or interest a thing once begun should be abandoned, it is immediately dubbed to have been a failure. Far better, therefore, were it to apply funds to matters hoped and intended to become both lasting and self-supporting.

Confining one's self, for the moment, to women's work, there should not be the slightest difficulty in entering upon industries for the employment of girls and women of a kind practically without risk, and carrying upon their face probability of continuous success amounting almost to certainty. To take a case in which the needle is concerned. One finds that the 'making up' of goods is, happily, being transferred from the garret of the seamstress to the factory of the producer, with the result that not only do both become material gainers, but the worker lives a happier and more cheerful life. The transition is, moreover, a gain to the community at large, for the sanitary attributes of a modern factory are incomparably superior to those of poverty-

stricken workrooms, and hence the danger of dissemination of disease is greatly minimized.

The transference from garret to factory would be far more rapid did not the high rents of the Metropolis so heavily militate against it. In the case of such light goods as shirts and blouses, factories at a distance from the Metropolis offer great advantages; hence we find them established at distances varying from 9 or 10 miles—as, for example, Edmonton—to over 100 miles; Nottingham, 125 miles, might be cited in this relation.*

With regard to Nottingham, I find that 'making-up'—a thing unknown not many years since—is now proving an important and steadily increasing branch of industry. It appears to have begun by 'mob-cap' making about twenty years ago, followed about twelve years ago by 'bodice and blouse' making. At that date the latter branch was introduced in a very small way, but to-day this light occupation gives employment in the various factories to not less than 6,000 or 7,000 hands, or even more.

I recently took the opportunity—by the courtesy of some of the manufacturers—to visit some of the Nottingham factories in which such light industries are carried on. I am, of course, not at liberty to describe any of the mechanical details that were

* The cost of carriage upon such light goods of intrinsically high value is almost negligible; hence we find large shirt and similar factories at great distances from London—as, for example, at Coleraine, in the North-West of Ireland.

shown and explained to me; suffice it to say that one saw there large numbers of girls engaged in cleanly occupations and work eminently suitable for female hands. They appeared quite happy, and the hygienic conditions under which their work was being carried on satisfactory. Nevertheless, in the case of a Garden City, not only could these be improved, but employment given to girls by this means could, with appropriate thought and provision, be made available to those suffering under certain disabilities, and hence helpful in the philanthropic sense.

Here, then, is a sphere in which women not only could assist in the establishment of an apposite industry upon a solid commercial footing, but they could combine with it *practical* and *permanent charity* by bringing out into light and air and beauteous surroundings the weakly ones of the slums, and those sadly handicapped in the battle of life. For the 'wherewith' to purchase a few hundred sewing-machines and to erect a hygienically perfect factory in which to install them they could with confidence look to us—mere men.

Other industries of the lighter class—but by no means necessarily of lesser importance—yet equally *apropos*, could be mentioned.

Hand-lace making may be mentioned as typical of the fact that hand processes cannot be profitably carried on in prosperous countries, where, it follows, labour is more or less highly paid, except where

climatic conditions are such that agricultural operations practically become suspended during the winter months. It was due to the last-mentioned condition that lace-making came to be established in Switzerland. Previously it had existed as an all-the-year-round domiciliary occupation, characterized by its *al fresco* nature, upon the more temperate side of that manner-dividing mountain chain—the Alps.

The Lombardian lace-makers doubtless existed long before the lace pillow was ever seen in the abode of the hardy Switzer, who himself at a later date trained himself to occupy his long winter evenings with this delicate work. In Italy we find the industry confined principally to the lowlands; in Switzerland it is more of a mountain industry. The principal seat of the Swiss industry in years gone by was the mountain village of *St. Croix*, in the Jura chain (of which an illustration is given), and in this relation it is interesting to note that it was undoubtedly introduced there by the Lombardians.

The first inhabitants of St. Croix, according to the *Chatelnerie* de St. Croix*, preserved at Turin in the archives of the House of Savoy, were the Mermods, the Junods, and the Bornands, who were living in Turin about the year 1150. These names have survived, and it is to Mons. L. P. Mermod, of the celebrated firm of musical-box manufacturers of that name, that I am indebted for much interesting

* The archives of the church.

information, more especially that regarding the manufacture of musical-boxes,* upon which he is such an authority. Moreover, Louis Mermod, father of the four brothers constituting the present firm, it is interesting to note, took a prominent part in the introduction of the lace industry, himself employing between the years 1810 and 1836 several hundred *denteleuses.*

How the industry came to migrate northwards is interesting. It must be borne in mind that the Jura chain was, and in places still is, a densely-wooded one, and it was the product of the forest upon which the inhabitants first subsisted. This gave rise to its colonization by small groups of foresters. Then came, in the eighteenth century, a certain amount of iron-smelting. This denuded tracts of the densely-clothed mountain-side, and then, as a natural sequence, followed the raising and care of cattle and a small amount of agriculture upon the clearances thus made. The iron manufacture appears to have died out about the commencement of this century, the blast-furnaces of *Jouguenaz* being blown out in 1780, whilst the utility of those of *Bas-de-Noinvaux* was suddenly put an end to by a flood in 1812.

Up to that time tree-felling, charcoal-making, ore-winning, and iron-smelting had formed the work of the inhabitants—work of the most arduous nature,

* For the only published description of this fascinating industry see 'Across the Great St. Bernard,' by the Author.

by reason not only of the callings themselves, but also of the mountainous nature of the ground and the terrible apologies for roads then existent, or coming into existence by the brute labours of man and beast. Forestry therefore declined, and the work of the mountaineers became purely agricultural. But agriculture is not to be pursued at such great altitudes all the year round, and if followed as a summer occupation only, it would require to be unusually lucrative to enable the workers to subsist in comfort during the long winters. But the *brusque* occupations were to give way to industries presenting the greatest possible contrast to them, for towards the middle of the eighteenth century a new industry sprang up in the district of Neuchâtel, and this was entered into with avidity by the persevering and industrious inhabitants of the little town to which I have referred, this *St. Croix*, doubtless at one time merely the site of a rude cross set up in the woods near the mountain summit.

The industry introduced to profitably employ the long winter evenings, and often days, was that of lace-making. Naturally, from its *genre* the women —especially the younger of them—were the first to take to it. They were, however, soon followed by the younger men, and although the intricacy and smallness of the work and the delicacy and skill called for was in such contrast with the outdoor occupation of the men, still, it is easy to see why

they should also have taken it up, when we consider the lengthy hours of winter during which they were unable, by snow and darkness, to follow their more ancient avocations.

We all remember how George Stephenson, the great engineer, by watching the busy needle and skilful fingers of his wife in his evening hours of relaxation and reflection, became a needleman of no mean merit, and how in the evening of his own years he on more than one occasion astonished young ladies similarly occupied in their drawing-rooms by giving *them* lessons in the art more usual to their sex and to their own more delicate fingers. So it is easy enough to conceive how the steady young husbandmen of the Jura Mountains, spending their evenings alternately in singing and in puffing clouds beside their sisters and sweethearts, should have followed 'Geordie's' example, and themselves learned the art of lace-making, and themselves become *denteleurs* under the tuition of their fair companions, the *denteleuses*. Moreover, it is easy to conceive, when we reflect that such occupation spelt money to them, that in but a short time the *coussin à dentelles* was to be found in almost every cottage of *St. Croix*.

A very pretty picture such evening occupation presents to us. Instead of a family idly and dolefully counting the hours of enforced inactivity, bewailing the harshness of the elements, the abnormal inclemency—imaginary or real—of the winter, and

retiring to rest dissatisfied and sadly, this could we have seen as the interior *tableau* of one of these rough and uncouth wood châlets, with its roof piled up a metre deep in snow, its door forming the end of a deep cutting giving access to the centre of the steep street, itself consisting of nothing but a spade-cut trench in the deep, pure white snow, so that passers-by could not even be seen, and by which alone the forester who had sledged a few pine-trunks down into the valley could regain his log-spread hearth.

Thereon we see the ruddy embers of the fir-logs and great larch clippings, ever and anon brightened up to an ardent red by the fitful draught, responding to the rushings of the fierce wintry blast over his timber chimney-pot, and which could be heard howling and whistling without, catching up in its chill and invisible fingers, and hurling and whirling in circles and wreaths on the bleak sides of the Great Chasseron, the crisp snow, which rises and falls and glistens like foam in the frosty brilliancy of the winter moonlight.

There in the room forming kitchen, parlour, and bedchamber, as neat and scrupulously clean as it were possible to picture it, with its white ceiling-boards and walls, its red-tiled floor, and its brazen utensils, so bright that they do efficient service as spherical mirrors, stands in the centre of the floor the small round table, upon the centre of which flames (somewhat noxiously) the *craisu*, a lamp

giving a bright white light from the burning of a mixture of tallow and oil. Around the table we see sitting two girls and two men, a glance at whose countenances suffices to tell us at once that the two former are sisters.

The elder of the two girls wears an expression at once more intent and more serious than that of the younger—more intent because she is the elder and the counsellor, and even now is reflecting that certain rent and other payments are becoming due, whilst the lengthening of the lace does not make such appreciable progress as to remove the look of care—more serious because she, too, is a mother, and the laboured breathing of a little one, shaded from the lamp by a red-white table-cover depending from a couple of nails in the ceiling beam, raises fears in her mind more compatible with a perturbed than a placid countenance. We notice that the Switzer at the *coussin* opposite to her—a handsome fellow with dark hair, thick burly eyebrows, and a somewhat aquiline and Italian cast of countenance—is as intent upon his 'piece' as his wife.

We note, too, that the younger sister, with her bright smiling face and her very roguish eyes, seems to be able to command and control the rapid movements of her deft hands and flexile fingers quite without the aid of those brightly-twinkling orbs, which appear to be set a-smiling by the contemplation of the laboured movements of a pair of rough hands belonging to the younger man opposite. His

face is intent to absorption as he peers down upon his brightly-lighted cushion: for in front of each operator stands a large glass sphere, or *kügel*, filled with clear water, by which the light of the lamp is concentrated and thrown brilliantly upon the all too slowly growing lace, which is affixed to a cushion pinned upon a lightly-traced pattern.

Each worker has her or his *coussin*, across which lie the numerous fine silk threads, terminating in such a bundle of bobbins as to render it impossible for the uninitiated eye of the ordinary mortal to pick out any particular or individual one. Every now and again we see that our diligent, albeit sluggish, worker, with a little sigh of relief, allows his apparently innumerable bobbins to rest whilst he looks dreamily across the table, and then every trace of effort and solemnity flies from his features by reflection from the happy face before him, at which transformation a little ripple of a laugh and a '*Wie geht's, Antoine?*' escapes from the happy girl. One need scarcely tell the reader that *he* is *her* pupil, and that *she* on Christmas Day will be *his* wife, and the old folks will be there to see.

But where are they? There, so close up to the rough chimney jambs and overshadowed by the high and beetling mantel-board that we had hardly noticed them. There on one side of the gaping fireplace, a large white cap tied under her chin, sits grandmother, mother, and mother-in-law in one. Her fingers, though her eyes are no longer fit for

the intricacies of the lace cushion, are not idle : the four long, bright needles, embedded in the steadily-growing drab stocking, flash still quickly in the bright ruddy rays, as quickly and with as little aid of eyes as they did when she, a mountain maiden, was set to watch and limit the leisurely peregrinations of Liza, the cow—ah ! so many, many winters past.

Her eyes scarcely ever rest on her work ; they stray instead alternately—from behind a pair of great round spectacles in horn frames—from the bright-faced girl at the table to the contented, grizzled face of the stalwart and once handsome forester at the opposite side of the chimney, sitting in a rough high-backed chair and looking intently into the glowing ember logs, where he sees them—huge trunks—sliding down the steep mountain-side from a burst dam, engulfing poor Fritz, his younger brother—yes, five-and-forty years ago—dealing to him the heaviest blow of his life ; for it was he who built the dam, and deemed it sufficiently strong. His slow, far-back thoughts cause the great long whiffs from his huge pendent pipe to come at unwontedly long intervals, and to escape from below his iron-gray moustache with unusual deliberation.

We can just see enough of the old lady's eyes from behind the disfiguring *lunettes* to note that when they look towards Iselle and Antoine they shape themselves into a twinkling smile so much like Iselle's own. Then her thoughts are vacillating between the

village church of *St. Croix* forty years ago and what it will look like on Christmas Day. When she slowly turns her head towards the old man, we see her eyes and countenance take a more thoughtful and more serious expression, exactly like that of the elder daughter, so quietly bending over her cushion there. Her countenance also becomes a thought more serious as her ears catch the sound of the baby cough from behind the table-cover there.

And so, like the horological work of *St Croix* itself, does the clockwork of humanity move ceaselessly on. Here is a mechanism, by mere age and diurnal wear and tear, irreparably stopping and losing its utility; there is another to replace it. It may be a perfect mechanism; it may be one of lesser perfection of construction; it may be one so strong and so adjustable as to give neither trouble nor call for repairs; it may be an agglomeration of parts, wondrous and intricate, like those of the wee one there whose main-spring works all too feebly, which for all its existence may give cause for solicitude and constant trouble. And so, swiftly, ceaselessly, like the recondite mechanism of artifice, does the great mortal clock of the natural world move ever on.

Let us walk a few steps farther between the glistening snow walls high above our heads, with the fresh-fallen snow grating and cracking crisply beneath our feet, to peep through a shutter-crack into the timber salon of the little village auberge.

There we see another round table, another brightly-burning lamp, another circle of glass-converging spheres, another circle of smiling faces, their owners all at work. At an adjoining table are half a dozen old men playing some game of cards, different to ours, and which we cannot understand: down go the cards with a thud one after another, and down go the scores, for they are chalked on the age-darkened table-top. An old mountaineer, with a bushy beard and grizzled face, is singing a national song, the while beating time for himself with his long pipe, which he holds by the bowl and waves baton-like from side to side before his face. Now as a signal he waves it in a circle above his head, and all the lads and lasses round the lace-work table there, without desisting from their labours, join in chorus, which by the harmonious merging of the clear *soprani* of the girls, the robust *baritone* of the swains, and the very grave *bassi* of the old men, is grandly harmonious.

Thus did the lace-making industry of *St. Croix* go on, an occupation which happily meant not alone harmless amusement, but bread and cheese, and, indeed, something more, for we are told that the *gentilles dentellières de St. Croix, les plus habiles*, could earn a good return from their occupation.

Shall such a picture of domiciliary industry be again produced in a Garden City? I cannot say! No one can say but—*the ladies!* Should *they* choose, it *shall be!* At least, so it would appear if we

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Lace-worker's 'Pillow.

are to believe the following statement which has recently appeared in several of our London papers:

'Through the instrumentality of the Lace Association, formed a few years ago under the patronage of Queen Victoria, an old and interesting industry in Buckinghamshire has been revived with gratifying success, and, since its establishment in 1897, more than £3,500 worth of lace has been bought and sold by the organization, which supplies its workers with regular employment and provides them with designs copied from old patterns. Owing to the generous patronage of the ladies of the county, the revival of this branch of artistic work is extending more and more, and Buckinghamshire lace has now a distinct place of its own in high-class trousseaux.'

To read such was certainly most gratifying, and the reference to a 'trousseau' immediately set one thinking whether a marriage between the *débutant* Garden City and this still youthful Lace Association could not be 'arranged'—as the 'society' papers would have put it. To my non-maternal mind it appeared most promising and feasible, but at the very first step I entered upon a serious difficulty, for the bridegroom was nowhere to be found. The kind ladies who had acted so efficiently as foster-mothers, and who were so solicitous in regard to his prospects in the world—whether it were due to excess of modesty or lack of commercial instinct upon their part cannot be said—

as will be seen from the extract, quite omitted to give publicity to his address. Nothing daunted in a good cause, I poured out my troubles into the willing ear of Mr. Alan Cole, C.B., of His Majesty's Science and Art Department; but although Mr. Cole told me more than I had ever heard about lace and the 'ins and outs' of the lace industry, yet he could give me no inkling of the missing address. From Sir Arthur Bigge, e'en from the 'Privy Purse,' nothing but courtesy emanated, until, by the kind intervention of Lady Rothschild, I found the President of the North Buckinghamshire Lace Association, in the person of Mrs. Walter Carlile, to be intimately identified with the retiring —though advancing—industry. All this took several weeks, during which I several times wondered if a busy bride, intent upon seeing the finishing touches put to her *trousseau* and the rich laces carefully deposited in her trunks, would have had the patience to have found out from whence the *home-made* product was procurable, or whether it would not have ended in the order going to the sturdy Flammond or the sloe-eyed Lombardian.

The name which comes uppermost to one's mind in connection with hand lace-making is undoubtedly Honiton, and certain it is that Devonshire has played the most important part in connection with this subject. The industry appears to have been carried on continuously in Devonshire for more

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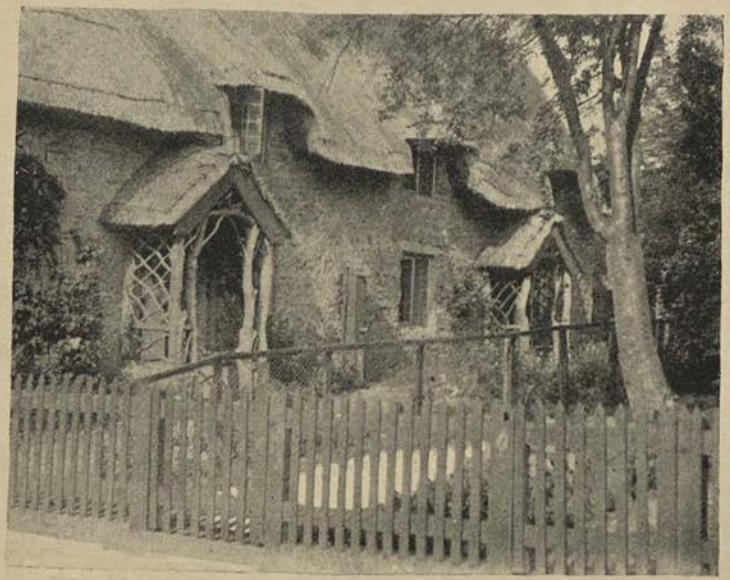


The Home of a Lace-maker.

than two hundred years. In the churchyard at Honiton there is a table-tomb with a very ancient inscription on a brass inserted in it; it runs thus: 'Here lyeth y^e^ body of James Rodge, of Honiton, in y^e^ County of Devonshire, (Bone lace-siller, hath given unto the poore of Honinton P'ishe, the benyfitt of £100. for ever.) who deceased y^e^ 27 of July A° D° 1617. Ætatæ svæ 50. Remember the Poore.'

The industry is said to have been introduced into Devonshire by sundry Flemings, who took refuge in England during the persecutions of the Duke of Alva. The parish register of Honiton contains many names of Flemish origin, whilst up to a comparatively recent date the Honiton lace-makers were many of them of Flemish origin. It is clear that the manufacture was well established as early as 1630, as Westcote, the Devonshire historian, then wrote: 'Here is made abundance of bone-lace, a pretty toy now greatly in request; and therefore the town may say, with merry Martial: "Ille ego sum nulli nugarum laude secundus."'

> 'In praise for toys such as this,
> Honiton second to none is.'

For a long time the industry, although extensive, consisted principally in producing the net, or 'Honiton Ground'—a net much like the present machine-net—in which the sprigs, first separately

made, were worked in on the pillow. Net made in this way of the finest thread procured from Antwerp, the price of which in 1790 was as much as £70 per pound, was necessarily very expensive. An ordinary lady's veil of this kind would cost from twenty to thirty guineas. But a great change was destined to take place, for upon the introduction of machine-made net in 1808 under Heathcoat's patent, the guineas became reduced to shillings, and subsequently to as many pence. Hence the hand-made net industry could scarcely be carried on, as a living wage was hardly obtainable from it. The depression thus caused continued for some twenty years, when Queen Adelaide ordered a Honiton lace dress to be made of Honiton sprigs sewn upon machine-net. This gave a certain impetus, but not of a very lasting nature, as few ladies followed the example set until Queen Victoria ordered her bridal dress to be made of Honiton lace. This was ordered to be made up of Honiton sprigs connected together by a variety of open-work all worked by hand and upon the pillow. This beautiful dress was made at Beer, and cost £1,000.

From the date of our late Queen's order the industry revived. The fashion was set, and demand followed, affording a good livelihood to the female labouring population, numbering many thousands of hands, and dwelling in that part of Devonshire

A Lace-maker and her Bobbin-winding Machine.

comprising Seaton, Exmouth, Exeter, and Honiton. From that time to the present it has held its own, due to the solicitude of ladies, foremost among them having been the late Mrs. Treadwin, of Exeter, whose successful work is continued by Mrs. Herbert. Most valuable, also, has been the work of Mrs. Fowler and her school at Honiton, and that of Miss Radford at Sidmouth; whilst the introduction of Italian lace-making by Miss Bowden at Beer, and the elevating effect of Miss Audrey Trevelyan's beautiful adaptations at Seaton, have gone far to crown with success the laudable effects of revivification. The industry has always been a cottage one, and in the mild climate of Devonshire frequently an *al fresco* one. So that the tourist, amid the picturesque valleys and coombes, may often hap upon a prettily embowered living picture formed by a young lace-worker with her pillow on her lap, or an aged matron, seated in her rustic doorway, overhung with vine, clematis, or jessamine, rapidly plying her lace-sticks from side to side to produce sprig or border—a worker recalling the lines of Cowper:

> 'Yon cottager, who weaves at her own door,
> Pillow and bobbins all her little store,
> Content, though mean, and cheerful, if not gay,
> Shuffling her threads about the livelong day,
> Just earns a scanty pittance, and at night
> Lies down secure, her heart and pocket light.'

Women's work in regard to the revival of this

fascinating industry is more forcibly apparent in those counties in which it had become all but extinct, and it is the work of these pioneers which we find being perpetuated to-day through the instrumentality of other ladies, who have banded themselves together with this object. The several lace associations which now exist are of quite recent date, whereas the work of the pioneers extends back a considerable number of years. I shall have occasion to refer to the revivification of antique torchon or linen-lace, and in regard to this the Hon. Rose Hubbard informs me that the first efforts were made more than thirty-five years ago, whilst with regard to the revival of the Northamptonshire industry, I learn from Mrs. Harrison that she went to reside in the village of Paulers Pury, near Towcester, in Northamptonshire, in 1883.

At that time Paulers Pury was a poor and straggling village of some 1,200 inhabitants, although many years before that date it had been one of the chief centres of the Bucks lace-workers. Indeed, some of the finest lace in the late Queen's trousseau had come from thence. For a score or more years Mr. Rose—one of the best of the old lace-buyers—had had his headquarters there, and the employment produced by his purchases proved more remunerative than agriculture; for whereas from the latter an average wage of from eight to

An Old Couple: Buckinghamshire Lace-workers.

Photographed by Miss Burrowes, Buckingham Lace Association.

ten shillings only was obtainable, the prices paid to skilled lace-makers were so considerable that some of the men and boys, one is informed, earned a guinea a week at their pillows.

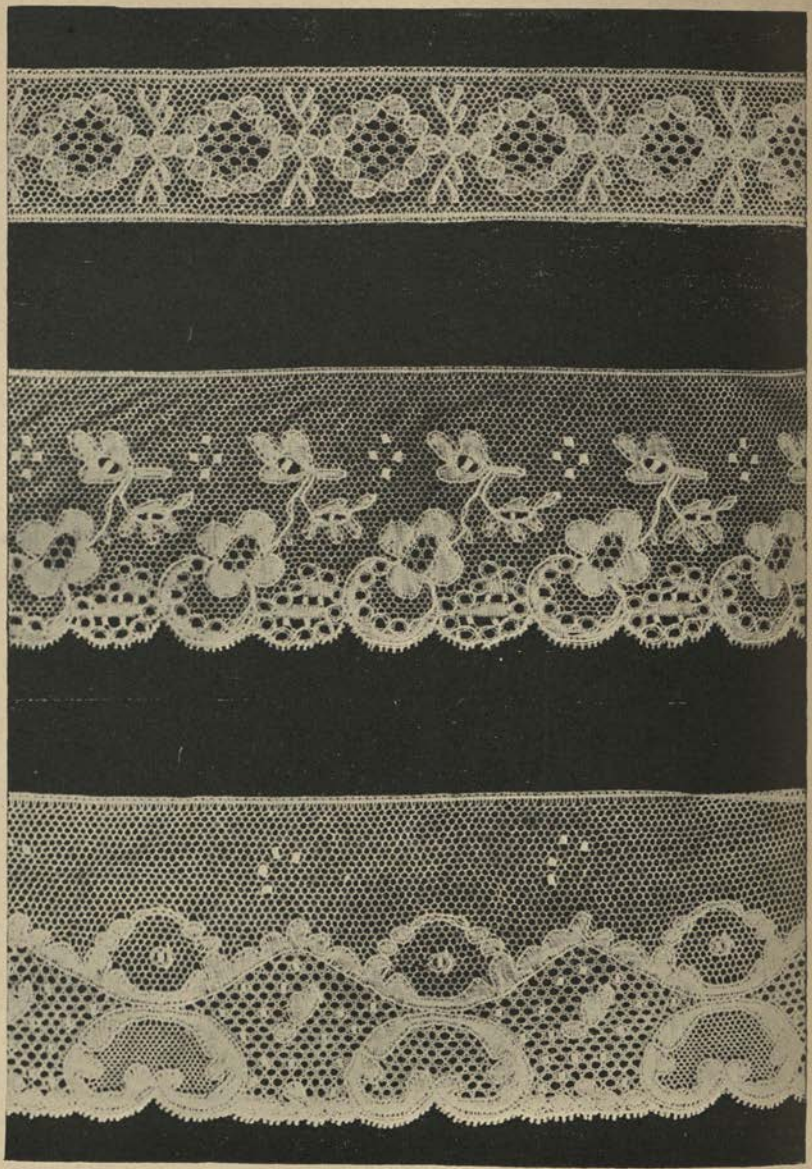
The causes of the decline of this hand industry were many. Firstly, the invention of mechanical means of producing the beautiful fabrics, and the setting up of machinery in Nottingham and other Northern towns, where was manufactured, in large quantities, imitation lace of beautiful design and finish, and of extraordinary cheapness in comparison with the hand-made article. Secondly, the prejudice created amongst philanthropic people by the harsh and unhealthy treatment of very young children in the little lace-schools held at that time in every Midland village. Thirdly, the keeping of girls at home from service in order that they might make lace, and the consequent lack and inefficiency of modern household servants. Fourthly, the passing of the Elementary Education Act, which caused the establishment of a good school in each village, made daily attendance compulsory, and entirely did away with the old-fashioned 'lace' and 'dame' schools, the latter having been hitherto considered sufficient for the educational needs of the agricultural population.

How the revival of hand lace-making in Northamptonshire came to be entered upon is interesting, for it was *quasi* accidental. 'When I came to

Paulers Pury,' says Mrs. Harrison, 'no really good or fine lace was made in the village. A lace-buyer from a distance came once a month to a cottage on the green, and a few elderly women took their work to him—chiefly Maltese lace made with coarse thread and of debased design. The village was very poverty-stricken, and in the winter men and boys suffered for many weeks from scarcity of work, owing to the acreage of arable land of the village being small in comparison to the population.'

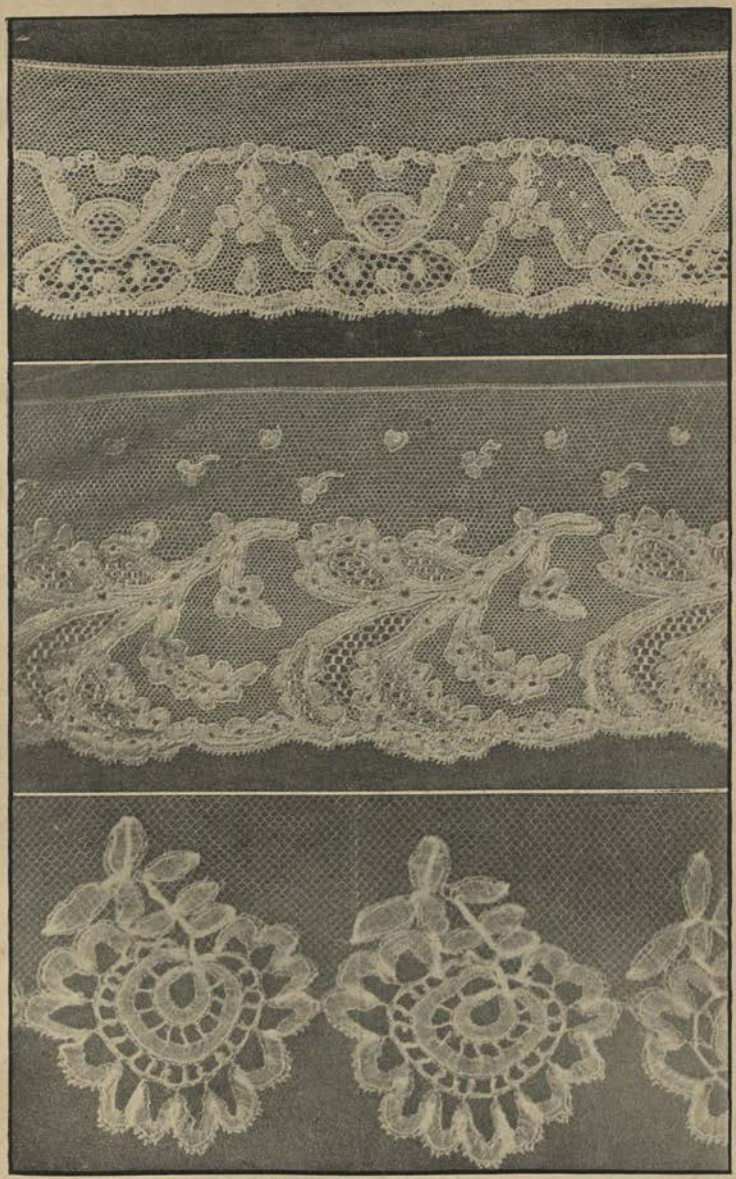
At this time a circumstance occurred which had a remarkable effect, for, to her surprise, Mrs. Harrison, in October, 1883, received a letter from H.R.H. the Duchess of Edinburgh (now Duchess of Saxe-Coburg), containing a cheque for a considerable sum of money, with the request that a large quantity of fine, narrow Bucks lace, of which a pattern was enclosed (this having been originally made for Queen Victoria's *trousseau*), should be made and supplied to her. 'After considerable trouble and persuasion,' says Mrs. Harrison, 'I managed to induce some of the older women to undertake the work for this order. It was completed within two years, and from the moment I received it the idea of reviving the old industry (purged from its former abuses) took possession of my mind, and has since formed the chief aim and pleasure of my life.'

Mrs. Harrison's good intentions and the efforts of those led by her have borne good fruit. 'At



Samples of Lace produced by Mrs. Harrison's Workers.

A, 'Crost Bough,' very fine old Bucks 'Footing'; B, Old Bucks Point, showing all well-known stitches—'cloth' stitch, 'Honeycomb,' 'May-blossom,' 'Plait,' etc.; C, 'Bee-hive,' one of the oldest Bucks patterns.



Samples of Lace produced by Mrs. Harrison's Workers.

A, fine old Bucks Lace ; B, 'Queen Anne,' the oldest and one of the finest Point Lace made ; C, 'Oak Leaf,' old Bucks Lace.

this moment in Paulers Pury about 140 women and girls make lace, the latter chiefly between the ages of twelve and fifteen, as we try carefully to avoid the old error of allowing the industry to interfere with the profession of domestic service. With regard to earnings, a married woman with a family, and all her own home work, washing, etc., on her hands, will earn from 3s. 6d. to 4s. weekly; a married woman without children, or a single woman, double that amount. For the last eight or nine years I have frequently paid skilled workers as much as 15s. or £1 weekly. Although such earnings may be considered paltry in comparison with those gained by factory hands, yet it must be remembered that lace-making is essentially and entirely a home industry, and can be carried on without neglecting home duties. The expense of thread, etc., is nominal, and the work can be performed without fatigue or roughness or wear and tear of any sort.'

During the last twelve years the industry has spread most encouragingly throughout the Midlands. After much importunity, Mrs. Harrison obtained from the Northants County Council a yearly grant of £15. By means of this small grant five village classes are carried on annually in the county. The expense of each class is £3, and in each eight pupils receive instruction from a skilled teacher. These same skilled teachers have held classes in

other counties, and quite a brisk trade in 'village-made' pillows, bobbins, and all lace-making accessories is carried on.

The outcome of this pioneer work was the Midland Lace Association for the Counties of Northamptonshire, Buckinghamshire, and Bedfordshire, which owes its origin in 1891 to the united efforts of several ladies, who had at their head the late Countess Spencer. An exhibition, opened by H.R.H. the Duchess of Teck, was held in Northampton. Great interest was excited, and from that day an impetus was given to the lace-makers. A large amount of lace is now sold by the agents of the Association, and many cottagers in the various villages thereby obtain very substantial help. Local exhibitions are held from time to time, and the Association has always a stall of beautiful lace at the Home Arts and Industries Exhibition held at the Albert Hall. The laces made vary from the finest point ground to the thick linen torchons, the patterns still made being frequently extremely old ones. Some of the workers who thus obtain employment are of great age, yet their work is exquisitely done. In some of the villages under the supervision of this Association classes for instruction have been begun, and the County Council occasionally aid with small grants for paid teachers. Since the foundation of the Midland Lace Association, the good work of

A Lace-worker of Half a Century ago.

From an old painting. Photo kindly sent by Miss Isham, Midland Lace Association.

Mrs. George Smith, one of the Hon. Rose Hubbard's Workers.

which has been aided, with so much earnest energy, by Miss Isham, of Oak Lodge, Duston, Northampton, who acts in the dual capacity of honorary secretary and treasurer, others of a similar kind have been established in different parts of the country.

In regard to Buckinghamshire lace there are two varieties—known as Italian and Greek guipure—differing entirely from pillow-point, and much speculation has arisen as to how this industry came to have its birth and to be confined exclusively to two or three villages in the heart of a 'pillow-point' country. The explanation, however, is as simple as it is pleasing. Over thirty-five years ago the work of reproduction of antique linen lace was started in the small parish of Addington, near Winslow, Bucks, its initiation being entirely due to the Hon. Lucy Hubbard, second daughter of the late Lord Addington, a lady who possessed a singular love of lace, and a natural gift enabling her to classify and appreciate it at its proper value. It was Miss Hubbard, indeed, who set on foot the first practical revival of the lace industry in North Bucks, subsequently employing between thirty and forty women; these, working under her directions, copied from lace in the possession of the Addington family a considerable number of antique designs in Italian, Flemish, and Continental pillow laces, some of them of great beauty and intricacy

of pattern. The manufacture, moreover, has not been confined to white lace, for black silk and fine black thread borders of much beauty have recently been produced. Among such was some exquisite lace of Brussels pattern, about 4 inches wide, copied by command of the Queen from lace in the possession of Her late Majesty Queen Victoria. The old Buckinghamshire half-stitch, although not absolutely neglected, still was not made to the same extent as the heavier linen laces known as guipures, and of designs dating from the days of Louis XVI.

At the present moment it is the sister of the above-mentioned lady—the Hon. Rose Hubbard, of Seven Gables, Addington, Winslow—who continues and has amplified the industry of linen lace-making, the number of workers employed by her having been increased to between sixty and seventy. Every year new patterns are adopted, in order to keep the supply up to date, both in design and colour. This style of lace, it appears, is especially well adapted for ladies' dresses, blouses, children's frocks, table linen, and such like, as well as ecclesiastical work and furniture. I have spoken of the introduction and growth of 'making up' in the town of Nottingham, and it is therefore interesting to note that Miss Hubbard has added a department for the production of ready-made articles of dress and furniture, such as tablecloths and chair-backs. The whole of the lace is made

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A Group of Lace-makers.

Photo by F. Newman, Woburn Sands, Beds.

on the pillow by the wives of the cottagers within a five-mile radius of Addington, which accounts for the concentration referred to. The workers receive payment for the lace as it progresses. The thread used is of the purest flax procurable, no cotton being employed even in the finest edgings to handkerchiefs; this precaution endues the lace with a durability too often lacking. Miss Hubbard is assisted in this good and successful work by Miss King, to whom I am indebted for some of the photographs I reproduce.

Another energetic worker in connection with Buckinghamshire lace is Miss M. Burrowes, of Moreton Manor House, Buckingham. 'I started the revival of Buckinghamshire (or half-stitch lace, as it is locally called) in my district and surrounding villages,' Miss Burrowes communicates, 'some ten years ago, and through the kindly efforts and help of friends met with much success. Many beautiful parchments were given by friends, which were of great use; some of these were apparently from 100 to 200 years old, and specimens of lace made from the same parchments can be seen in the South Kensington Museum. I was able to help and employ some of the workers the late Duke of Buckingham had taken so much interest in and assisted more than twenty years ago. The workers are for the most part elderly, but, where possible, the younger women are persuaded to take the

industry up again, as they generally have learnt or know something about it to some extent. A few children are learning in many of the villages, but the lessons and help must be given privately, as the Technical Education Department is of no real assistance. The lace now made in this district is pronounced by connoisseurs to be the most beautiful of its kind seen in England for many years, and specimens of it have been selected for the American Exhibition to be held at St. Louis. Lace-making is one of the most thrifty and least troublesome of home industries, and can always be done at home at an almost nominal expense. In this district only, £500 was paid to the workers during the last twelve months (1903).'

In addition to the classes and instruction already referred to as having first been inaugurated in Northamptonshire, private classes have also been held in Herefordshire, Staffordshire, and Nottinghamshire, with great success. In concluding the particulars and details so kindly sent, Mrs. Harrison adds: 'May I say that throughout rural England there is no more deserving, industrious, or respectable class than our lace-makers. Aged widows ekeing out precarious resources or a scanty allowance; delicate, crippled, or even deformed girls—unfit for service or any active employment—busy married women snatching an hour to "set to their pillers," while the boys

Lace-maker, with Old-fashioned Pillow and Bobbins.

Candle-stool, Bobbin-wheel, and Pillow.

Photos kindly taken by Miss Rosemary Harrison, herself an adept at lace-making.

and girls are at afternoon school and the baby in the cradle ; children in the difficult period between leaving school and taking a first place—such are our lace-makers of to-day ! Surely all will agree with me that every encouragement should be given them to grow yearly more perfect in their skilled and beautiful industry.'

Such words could not, I think, be addressed to more appreciative ears than those of the members of the 'Women's League' of Garden City, and for that purpose I am pleased to be able to reproduce them. For it must be remembered that it is far from the desire of these pioneers that the resultant good should be confined to the villages over whose destinies they in a large measure preside ; they would be of the first to welcome co-operation to the end of beneficial extension. Indeed, the President of the North Bucks Lace Association—outcome of the example set by Mrs. Harrison's Northamptonshire Association—already foreshadows such amalgamation. I give the opinion in Mrs. Carlile's own words : 'In this, as in all enterprises, union is strength, and perhaps the *best and eventual solution of the problems* of the lace industry will be *to amalgamate all existing associations into one body.* It will be seen that our aims afford scope for much patient toil, also for much interest ; that they cannot be attained in one year, nor in seven, but that the progress already made

justifies our perseverance and our hope of great and lasting success.'

Whether lace-making be regarded as an art or as an industry, an art it may fairly claim to be—the only art except, perhaps, the closely-allied one of needlework that women have originated and developed for themselves; a genuine, though limited, expression of the æsthetic instinct that finds its highest utterance in architecture—an art of form unaided by colour.

From the open-work embroidery and network of the Middle Ages, first needle-point, then pillow-lace were evolved, till they came by the middle of the fifteenth century to be recognised as a distinct craft in the great industrial cities of Italy and Flanders, and from these centres lace and lace-makers found their way to every country in Europe. Venice stood then, as now, unrivalled for needle-point, Brussels ranking second; while pillow-lace was made in greatest perfection at Mechlin, Lille, Valenciennes, and Ypres. Some writers assert that the art was indigenous to these islands;* but whether it be so or not, we have in lace, as in much else, learned a great deal from our Continental neighbours. Tradition has it that

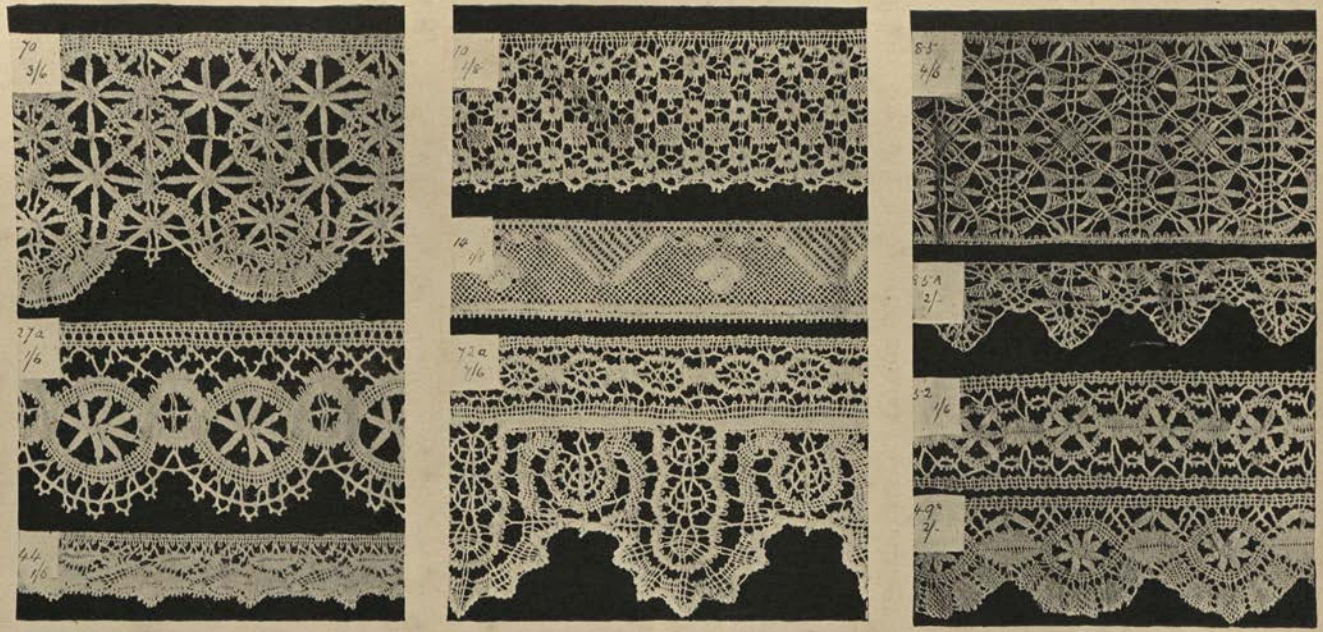
* It is also claimed for Italy and for Flanders, and from a picture by Quentin Matsys painted in 1495 we have evidence that the making of pillow-lace was known in Flanders at that early date.

Katherine of Aragon and her ladies, while living in retirement at Ampthill, in Bedfordshire, from 1531 to 1533, awaiting the reply to the Queen's final appeal to Rome, solaced their weary time of suspense by teaching the peasant-women of the neighbourhood all kinds of beautiful needlework, especially 'cut work,' which is now known as 'drawn-thread work,' and point lace. And though some elementary knowledge of lace-making may already have existed, Queen Katherine is regarded as the foundress of the lace industry in the Midlands; and the lace-makers' festival, 'Cattern's Day,' instituted in her honour, has only died out within the memory of the present generation. But it is to Flanders that English lace owes its development, if not its origin. During the latter half of the sixteenth century, hundreds of the refugees who fled from the desolating Spanish wars and religious persecutions in the Netherlands settled in England, and spread their superior skill in pillow-lace and wood-carving throughout the Midland counties. It is Flanders lace that the women of Buckinghamshire, Bedfordshire, Oxford, and Northamptonshire, make to this day, and some of their work is hardly to be distinguished from that of Ypres, Lille, and Valenciennes of corresponding date. Devonshire also learnt the art from Dutch exiles. Honiton lace, both pillow and point, is of the Brussels school, but bears traces,

too, of later French influence, distinctly attributable to the Huguenot workers driven to our shores from Alençon and Argentan, of whom I have spoken in connection with the silk industry. In Ireland, where the art has been carried on and handed down almost entirely in convents, the work is Italian and Spanish in character.

In England the industry throve and grew to vast proportions, while the Netherlanders, with the recuperative power inherent in the dogged, persevering genius of their race, having achieved their freedom, set to work to restore their shattered industries, to regain their commercial supremacy, and, spurred on by the keen competition that their own martyrs to the faith had done so much to create, outdid themselves in beauty of design and delicacy of workmanship. The various schools of lace each borrowed in turn from the other; the flower patterns, faithfully copied from Nature by the garden-loving Brabançois, were adopted by the workers of Alençon and Venice; the intricate stitches of the *points de France* and *gros point de Venise* were reproduced by Honiton and Brussels, and imitated again in bobbin-made fabrics, such as *point d'Angleterre* and *point duchesse*, till elaboration and manual skill could go no further.

After the Golden Age comes inevitably the period of decadence. After two centuries of excess of luxury, a reaction in favour of simplicity set in; lace went



Typical Samples of English-made Lace.

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out of fashion, and was to a great extent discarded for muslin and blonde. The democratic spirit that began to make itself felt throughout Europe towards the end of the eighteenth century, and culminated in the French Revolution, went far to destroy, or at least paralyze, art in all its branches; and during the forty years following that cataclysm the art of lace-making, spasmodically revived by the short-lived glories of the First Empire, languished to the verge of extinction. In 1812 it received another blow by the invention of machine-made net, and only the patronage of the Church in Catholic countries and the personal interest of royalty in England kept it alive. In 1822 a petition was sent to Queen Adelaide on behalf of the distressed workers of Devonshire, to which she at once responded by giving an order for £1,000 worth of lace. The Duchess of Kent followed her example, and Queen Victoria did more perhaps than anyone to restore and encourage what would otherwise have been by now a lost art. But so far had it fallen into decay that, when her late Majesty required a large amount of Honiton and Midland lace for her *trousseau*, much difficulty was experienced in procuring workers sufficiently skilled to supply it. The impetus thus given, however, was strong while it lasted, and for the time lace commanded so good a price that boys were taught to make it; even grown men

worked at the pillow to supplement their scanty labourers' wages. The Great Exhibition of 1851 served as a fresh encouragement; but the rapid improvement in machine-made lace, and the curious deterioration in public taste so noticeable in the earlier half of the Victorian period, combined to war against the delicate art, and again for thirty years or more it almost disappeared.

'Victoria the Good'—if one only takes the trouble to reflect—appears never to have lost an opportunity of benefiting, by the fostering of industry, the most humble of her subjects, and this estimable trait in her continued to the day of her death. As late as 1898 we find her thus utilizing her vast influence by becoming patron of the North Buckinghamshire Lace Association, giving her orders through it, and exerting beneficent influence, which, happily, has lasted. Upon the formation of this Association, Mrs. Walter Carlile assumed the responsibility of presidency, and has continued it. She writes:

'I may say for myself, as for all concerned with it, that its work has been indeed a labour of love, amply repaid by the unlooked-for measure of success it has attained, both in the improvement of the work and in the genuine interest and appreciation it has awakened in the workers and their lovely fabrics.'

The younger association followed the example

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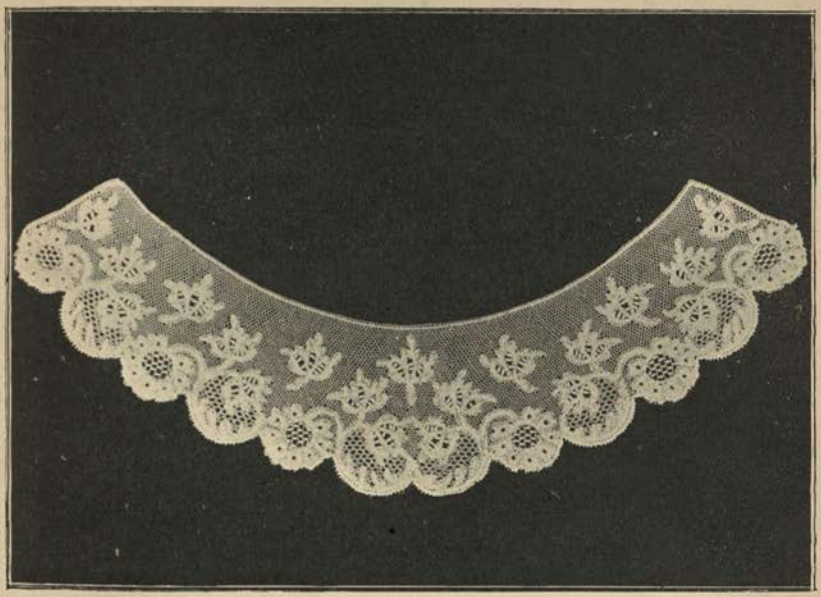

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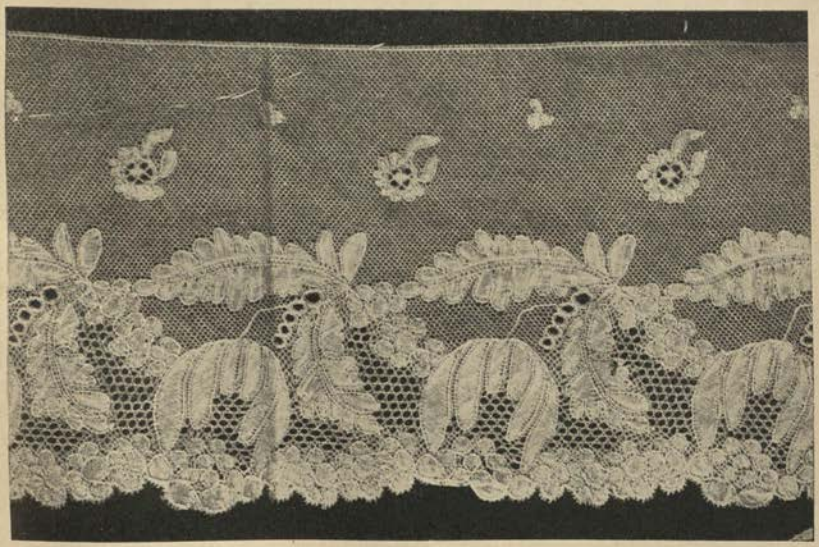


Samples of Work produced by Mrs. Carlile's Workers, North Bucks Lace Association.

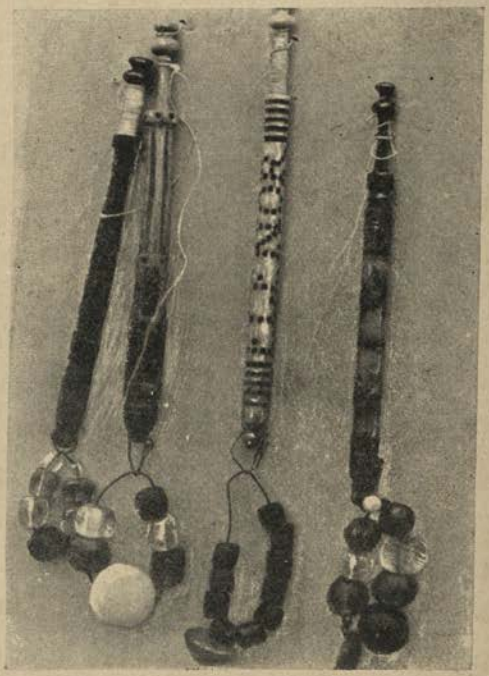
A, Collarette; B, fine specimen of 'Tulip' Lace.

of its predecessors to which I have referred, and the modus should be mentioned, as it would form a sound guide to any similar organization which might be formed in connection with the Hertfordshire Garden City. Some seven or eight ladies of the north division of Buckinghamshire constituted themselves a committee, and to each member was assigned the care of so many villages, in which she undertook to seek out lace-workers, supply them with the good designs and materials provided by the association, and collect the lace for sale. Bucks pillow-point (the term 'point,' by the way, is used of this, as of certain other forms of pillow-lace, to indicate the fineness of its texture, and has nothing to do with needle-point) is of the *genre* of Upper Flanders lace—a fine lace, that is, of flat surface, generally of flowing design, the main outlines of which are traced with a thick linen thread or 'gimp,' and worked in close stitches, while the ground is filled in with a variety of open patterns. It is made on a bolster-shaped pillow, on which a strip, 10 to 12 inches long, of the design, pricked on parchment, is fastened down. As the worker finishes one length, or 'down,' as they call it, she places another strip of the design immediately below the first, and so continues her work round and round the pillow until the required length is complete. The bobbins used vary in number according to the width and closeness of

the design ; a narrow edging can be made with twenty, while four or five hundred may be wanted for a wide flounce. The bobbins are amongst the lace-maker's most treasured possessions; they are of bone or wood, ornamented in many ways, and weighted with beads hung at the end. Sometimes brass or silver wire is twisted round the handles; more often they are inscribed with names, dates, or mottoes, and form a homely record of their owner's quiet life. 'Friendships and courtships,' says Mrs. Carlile, 'events that stirred the great world, and events of domestic interest, are thus chronicled ; and so the bobbins are a daily reminder to the girl of her lover, to the mother of her children, to the old woman of the days of her youth. Two bobbins of the same set now in my possession contain an unwritten romance. On one is rudely carved the words "Lydia dear," and the date 1798 ; the other bears the following verse, neatly tattooed in red and blue :

'"When this you see, remember me, and bear me in your mind;
For all the world is naught to me as long as you are kind."'

To return to the Lace Association, difficulties, as is the rule, were at first formidable. The object was not only revival and the improved condition of the workers, but also elevation in style of the product. Such lace-makers as still plied their trade had, for the most part, given up the fine



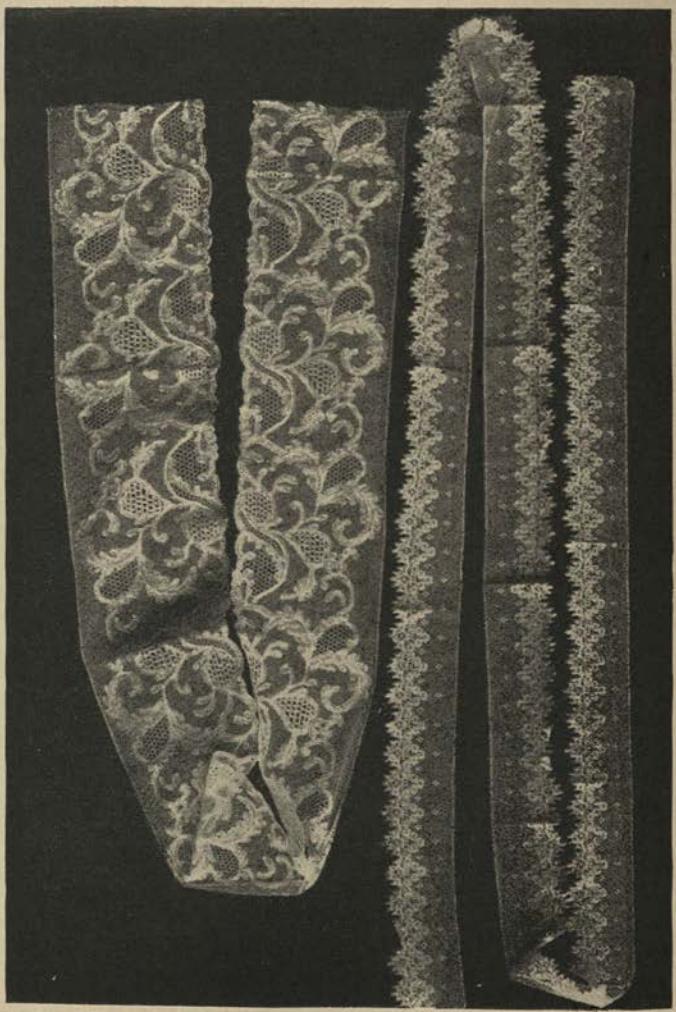
Lace-workers' Bobbins.

'half-stitch,' as it is locally called, for coarse Maltese and torchon edgings; and those who still clung to the Bucks point worked it in cotton, with clumsy thick pins and cardboard for parchment. Much persuasion was needed to induce them to use the finer materials, which are, of course, more troublesome to manipulate; but the enormous improvement in the results obtained soon begot in them pride of work, and the appreciable rise in the price their work commanded reconciled them to the increase of labour and care requisite. In the same way the old, graceful, flowing patterns had been abandoned for stiff and clumsy ones, devised by the workers themselves, monotonous repetitions of one conventional flower or leaf utterly devoid of artistic merit, that showed more plainly than all else to what a low ebb the fortunes of lace-making had fallen. Inquiry, however, led to the production (where they had escaped being burnt as rubbish or melted down for glue) of stores of old parchments that had belonged to the mothers and grandmothers of the present generation of lace-makers, and search among these brought to light innumerable treasures. To get the old designs properly and accurately pricked on new parchments was, and still remains, one of the greatest difficulties. It is a well-paid branch of the work, and might, one would think, be taken up with advantage by poor ladies' guilds or schools of art.

It requires some dexterity and a little knowledge of drawing, but is no great mystery.

The next step, the supply of very fine linen thread and lace pins, was comparatively simple, for the path had been smoothed by Mrs. Harrison, who had previously persuaded the manufacturers to produce once more linen thread fine enough for pillow-point, and pins to correspond. The importance of using linen thread, and that of the finest, is sufficiently obvious with regard to the texture of the lace; but besides this, the worker's touch, on which the beauty and evenness of the lace so largely depend, is much affected by her materials. Every worker has an individual way of handling the bobbins that enables her work to be recognised, not only by herself, but by connoisseurs, from among that of a dozen others made on identical parchments, and fixes its relative value; and the lightness and delicacy of touch so essential to the production of thoroughly good work are only to be acquired by the use of thread too fragile for heavy handling. Such manipulation must be acquired whilst young, while the fingers remain supple and unspoilt by rougher toil. But once thoroughly learnt, their cunning is seldom entirely lost; even after the lapse of years it returns with a little practice.

It might be thought that such efforts would be rendered nugatory by the fact that most of these



Specimens of fine English-made Lace.

girls leave home as soon as they are grown up, to find employment in towns as servants, shop-girls, and suchlike. This undoubtedly they do. Lace-making, nevertheless, still remains an excellent resource for them—a means of making money not to be despised in any grade of life in which they are likely to find themselves, especially after they marry; and experience shows that a large proportion of country girls marry back into their own neighbourhood and return to their old occupation.

The enterprise, as can well be understood, involved considerable outlay, which had to be met by subscriptions until a steady sale of the lace could be established. To effect such sale, not only had the quality of the lace to be improved sufficiently to command for it a ready market, but appreciation of its real beauty and value had to be aroused; and though the former was, beyond doubt, by far the harder part of the task, the latter, in these days of keen competition, is not to be overlooked. During the first year of the Association's existence, the Committee disposed of the lace privately as best they could; then, in 1898, a small sale was held in London, together with an exhibition of old English lace, where could be seen what 'Bucks point' used to be, and what it was hoped it would again become. Since then every year has shown steady improvement in the

quality, as also in the amount of lace produced, and the demand correspondingly increases. The Association now ventures to send specimens of modern as well as old work of Buckinghamshire to art exhibitions, and 'Bucks point' begins to find a recognised place among the lace of to-day. The lace manufactured by the North Bucks Association covers Pointground, Torchon, and Maltese silk laces, whilst linen lace from Miss Hubbard's workers passes through its hands for sale. The number of lace-makers now finding employment through the efforts of the ladies composing it amounts to some 300.

I have dwelt, I fear it may be thought, at too great length upon this one industry, but I have felt it advisable so to do, because it affords such a potent object-lesson of what can be accomplished by women even in regard to industry. Here is a case in which an erstwhile moribund industry obscurely exhibited its vestiges over a very large area of our country, the dispersion materially adding to the difficulties of organization. One of the strong points of Garden Cities would be facilities for organization combined with the ability on the part of committees and associations to keep in close touch with the workers. Here we have a case necessitating almost 'house-to-house' teaching. In a Garden City, not only could these workers be got together—in many cases the halt and the physically weak—but also collective instruction

could be economically given. Perhaps a still more important facility would be that of the coalescence of various branches of industry. I have elsewhere mentioned the great strides made commercially in 'making up' as a collateral of machine lace manufacture, and one is not surprised to learn that in connection with hand lace-making ladies and others in needy circumstances are employed in making up such things as hand-made teacloths, bed-spreads, Duchesse toilet-covers, kerchiefs, collars, d'oyleys, and even frocks trimmed with the lace of their district.

But the work of ladies in England has been comparatively easy when contrasted with their labour in Ireland. The Irish lace industry and its vicissitudes is a most interesting theme—one that space compels me to leave untouched. It has been truly said that lace was born in the convent, and hence in the Sister Isle it would seem likely that it should also be nurtured and sustained within such. Few, however, know the magnitude of the good work carried on in this connection within the walls of the Irish convents. Still fewer could picture the laudably *practical* manner in which the work of instruction, the shaping of brain-dormant and almost useless animate units into industrial workers of bright intelligence, is carried on. This awakening of intelligence, indeed, was rightly deemed likely to prove a further difficulty, for it must needs breed divine discontent with their former wretched

surroundings. There was, indeed, presented a maze of difficulty, that of dispersion being included. Yet the brave nuns, under the impulse given to them by the lady pioneers that the sinews of war would be forthcoming, went bravely onwards. From dwelling to dwelling, from village to village, they journeyed, only to learn that, besides the general apathy of the uneducated parents, in many of the mountain and outlying holdings the children could not come to be taught industries because they were without clothing. Kindness and ready hands soon clothed them, and in a short space they began to trip in gaily, attracted by the novelty and brightness of useful life, commenced with an appetizing breakfast of milk and hot porridge that awaited them after their long walk, and the class-rooms, enlarged and again enlarged, became full to overflowing. But what of their future? The danger of return to idleness was too dreadful to be thought of; it must be prevented. One can easily picture—because it is but a recrudescence of a mediæval tableau—the pavement beneath groined vaulting, the polished floors beneath the time-dimmed rafters of nunnerial roofs, spread thick with rich embroideries, tapestries, crochetings, beadings, tatting, and lace depending from the laps of gentle workers, but it requires an effort and the suppression of surprise to picture refectories and cloisters ringing out with the rattle of flying shuttles, the thuds of looms. Yet in this

wise were the sacred precincts welcomely invaded in order to fitly equip the apt and willing pupils to successfully support themselves in the battle of life. Happily, such nunnerial factories—as, for example, the one at the Foxford Convent (co. Mayo)—are living and robust facts, no debatable venture, nor the 'morning's winged dream' of a strong, too hopeful heart. The music of machinery now mingles with the voice of the river (Moy), waking the land from the long night of its lethargy, giving employment to the deserving poor. Yet the work of the pioneers, whose fine work I have dealt with at great length in regard to Irish dairying, is only just becoming felt. Its significance in regard to the subject now under consideration, however, is gratifyingly shown by the fact that even in 1896, through the instrumentality of that well-known body of philanthropic workers organized by the Countess of Aberdeen, and subsequently presided over by Her Excellency the Countess Cadogan, no less a sum than *ten thousand pounds* was paid through the Irish Lace Depot in Grafton Street, Dublin, to Irish lace-workers, this being but a portion of the value of the total of lace produced. Sufficient, I trust, has now been said to bring the subject of hand lace-making strongly to the notice of ladies who have the intention of interesting themselves in the work of Garden Cities, and in their hands I can, I am sure, safely leave it.

With regard to the machine lace industry of this country, its present unenviable position is due to two things: the fickleness of fashion and fiscal fallacies. The same Act—which dealt almost a death-blow to the silk fabric industry—referred to by the authority in the Appendix is again responsible. At the present moment fashion is not to blame; but our manufacturers have to face the following vagaries of 'Free Trade' (*sic*): If they send lace to France they are penalized by our neighbours to the tune of 35 per cent., *ad valorem.** This amount has to be paid by us before our goods can penetrate farther into France than Calais; but Calais is all the time sending large quantities of lace—as also her neighbour Caudry and the silkopolis Lyons—to Dover, and on to London, *free of duty.* The reader will observe what a very '*free*'—and easy—thing for our opponents is 'Free' Trade. But this is not the worst! The effect of this unfair trading—manufacturers inform me—they would 'put up with' if it went to the length of '*only preventing us doing an export trade*, leaving to us our *home* trade.' This, however, is not so. When Calais finds her stocks increasing she does not reduce the price, and send her

* This is upon *silk* lace, the silk having been made in their own country and passed into Great Britain duty free. On cotton goods the duty is practically prohibitive, being, at the lowest, double the above, and rising to 80 per cent. and more.

goods to Paris. Certainly not! that would not suit her at all, for that would 'bring down prices' in her *own* country to such an extent that she must perforce close down her factories. Very wisely, she prefers to arrange matters that other factories than her own should be closed. She must contrive that *our* manufactures suffer, *not hers.* It is easily done; she merely consigns her surplus to England at a price a fraction above the cost of the silk itself. And a good thing too, says the Free Trader, because we can then *buy* what we want *cheaper.* It concerns him not the least, so he thinks, if our factories are closed and our workpeople starving, so long as *he* can buy a little cheaper. But he is entirely wrong for two sufficient reasons. The consumer does *not* get the goods at the cheaper rate by reason of the same conditions which influenced the foreigner *not* to sell them *cheaply* in his own country; but so long as the middleman and the merchant can obtain the French goods cheaper than—under such unfair competition—the English manufacturer can produce them, it is obvious he cannot afford to buy and sell English goods. To show how unfair and illegitimate such trading is, the foreigner who, for his convenience, has 'dumped' into our country a batch of goods at *cost price* will decline to execute a 'repeat' order for the same class of goods. If more are wanted, increased price is charged.

Then, again, the 'Free Trader,' elated with pride at having been able—as he thinks—to obtain manufactured goods at a fraction less cost to himself, quite overlooks the fact that his ill-gained savings placed in one pocket disappear from the other in his rates, in the keeping up at public expense of huge workhouses and armies of workers who could work if work were available.

Speaking of 'French lace,' inquiries made in Nottingham evinced a state of things little short of ludicrous, operations, if one could only shake off all patriotic feeling, one could laugh heartily at. I refer to the *fetich* worship of 'French' fashions. There can, I should imagine, be no question of the superiority of French 'taste' in dress, although there is an interesting fact, probably usually overlooked, that the leader of 'French fashion' for so many years was an Englishman—Mr. Worth. Let us be perfectly fair, and let merit win! But, quite inadvertently, I dare say, ladies are not fair when influenced by the fetich of French taste; for so many of the things they admire as the produce of French art and French artists have never crossed French soil or been touched by French hands.

It comes about in this way: if a draughtsman, in Nottingham, for example, gets out a pretty and taking design, the 'buyer' *must* call it French or it would not '*go*.' It may be delicate and *légère* veiling, it may be a rich and chenilled lace; in

either case, if it be 'French,' its prospects in the world will be greatly enhanced. If it 'goes,' the English lace producer smiles at the advantage its supposed foreign parentage is to him, but, also if it 'go,' the foreigner, whilst erecting a fiscal fence to its progress into *his* country, will also 'adopt' it—or, rather, the English design—and straightway proceed to manufacture it at a cutting price, which his large output and more constant employment of his operatives enables him to do. A ludicrous position arises from this, for it often happens that the wives of Nottingham lace manufacturers are offered in the London shops as '*real French lace*' the wares of their husbands; yet the assurances of the shop assistants that the goods have but recently been 'received from Paris' may have been perfectly true. There is an authenticated case of a lady going to London to buy 'French' lace for the *trousseau* of her daughter, only to be submitted to the chagrin of having a portion of it shown to her next day in the 'sample' book at her husband's works.

This unsatisfactory state of things results in the fact—which has now obtained for many years—that the British lace-maker can find employment for but, at most, three months of the year instead of twelve. It is not to the point to argue that *when* busy the 'twist hand,' as he is called, can earn as much as five pounds a week. Human

nature and frailty alike decree that whilst he is earning good wages he will be somewhat more extravagant in living, and hence during the long periods of enforced idleness* distress comes upon him. This state of things, so socially unwholesome, is entirely preventable.

Strange, indeed, it seems it should have taken so long, and loss of trade should have been allowed so long to go on, without it being made apparent to us that all other nations were acting wisely and we ourselves unwisely. It requires no acumen in others, who reap the benefit of Protection themselves, to at once grasp the situation. Dr. Dowie—religionist and money-maker—visits Nottingham! He is allowed to see all he asks, and what is the result? He purchases a large number of the latest forms of lace-making machines—a branch of engineering far better understood here than in America—forthwith transports them to Chicago, and installs them in 'Zion City.' Does this preacher of equality and freedom intend to use them in a free, fair, and equitable manner? None of it! His Government has provided him with a wall of Protection almost impenetrable, for 40 per cent. *ad valorem* and upwards—*one-half their intrinsic* value—must be paid upon our goods entering the States. In a short time, from behind this wall of 'Protection,' the Doctor will hurl, not blessings,

* See reference to Nottingham Allotments.

but such merchandise as it may suit him to send to the 'free'—but not yet enlightened—old country.

It is most deeply to be regretted that the warnings of manufacturers and those in a position to understand and appreciate the trend of events should be uttered to deaf ears upon the part of the general public, and that the latter should be found wanting in the energy necessary to put themselves into a position to discriminate between the sober and seriously-put-forward warnings of the well versed and the noisy protestations of a small minority, enchained to obsolete and disaster-bringing and impracticable principles. The sad fact that, one after another, we are forced to relinquish our once important industries is now, happily, at last bringing about an awakening. I have mentioned these facts because they concern the subject under consideration, but were we to consider cognate industries we should find a similarly unsatisfactory state of affairs. For example, the silk ribbon industry in Coventry alone formerly gave employment to 20,000 out of a population of 42,000; to-day that same industry is nearing extinction. In 1857 we had in Macclesfield some eighty 'throwing' mills and eighty or ninety silk manufacturing firms; last year there remained only eight mills, and not much more than a dozen manufacturers. London in the early part of last century supported 24,000 looms, and 60,000 operatives were then employed in silk-

weaving; to-day not one-twentieth of the number of looms are at work; whilst Manchester, which but a few years ago had its 20,000 looms, to-day finds its silk trade practically extinguished.

I will now pass on to another and singularly interesting industry and occupation, also eminently suited to the weakly and ailing—I refer to *sericulture*. Before doing so, however, I should like to mention another which—by its very nature—should be profitably interwoven with the daily life of the City—namely, *floriculture*. If, as is to be hoped, Garden Cities are to contain manifold the number of flowers to be found in ordinary towns, then, *ceteris paribus*, such Cities will offer great increase of employment for gardeners. But why not gardenesses? The work is well adapted to be carried out by women, whilst it is intensely interesting to male and female alike. Doubly interesting, perhaps, in our uncongenial climate, for the reason that it calls for greater skill, perseverance, and resource in waging incessant battle with elemental enemies. I have elsewhere (see Horticulture, Chapter VIII.) dwelt somewhat fully upon hothouse culture, and shown it to be a very profitable branch of light industry. I have also (see Chapter V.) touched upon the employment of women, girls, and invalids in connection with it, so that I need not do so here.

Returning to *sericulture*, the essentials to the introduction are that there should be cheap labour,

and that the climate should be suitable for the efficient growth of the trees required for the food of the silkworm. *Primâ facie*, then, it would appear that Great Britain, by reason of its northerly location upon our earth, coupled with the fact that it is prosperous, and hence high wage-giving, is not well adapted to the carrying on of the industry.

Let us, however, bear in mind the Spanish proverb, '*With patience and perseverance the mulberry leaf will become satin,*' and give the entrancingly interesting occupation a fair hearing. For although I do not put it forward in the light—vast and important industry though it be—of an innovation of great national importance, as I do another great industry upon which I touch in this chapter, I think it essentially and eminently one of those things with which could be combined profit with philanthropy. For it is a cleanly occupation, well suited to give employment to women and children, consumptives, invalids, and even cripples.

Paradoxical as it may appear, prosperity may be disadvantageous! It is so in this case, because under ordinary circumstances it precludes the carrying on of simple occupations, returning but a moderate profit to the worker. Hence it has precluded us from seeing the picturesque sight one sees upon the Continent of the neat lace-workers in picturesque garb sitting at street corners busy at their work, as well as the romantic silk-workers of Italy.

We have to consider, therefore, if the two conditions of success to which I have referred can be fulfilled in connection with a Garden City. In regard to climate, this is not such a serious matter as might reasonably be expected. For we must remember that the white mulberry-tree (*Morus alba*) flourishes as far north as the forty-third parallel of latitude, whilst the ordinary mulberry-tree (*Morus nigra*) grows luxuriously in the South of England. It would therefore only be necessary to protect the *Morus alba*—which in India is grown in the form of a bush and cut back every year—during the winter months. Thus a cool or very slightly-heated glass-house would be all that is necessary; indeed, if common bass matting were arranged on wires to be drawn over the shrubs to prevent excessive radiation during the night this would probably prove sufficient.

In order to do justice in the consideration of this subject I have referred—in an appendix to this chapter—at some length to, not only the practical side of the industry, but the position it now occupies in relation to the countries of the world, as well as to the attempts which have already been made in regard to the introduction of this entrancingly interesting industry into our country, in order that it might be looked at from the 'black side' as well as from every other point of view. From this the reader will see that in each case failure was easily explicable, and also—at the date at which the trials were made in our country—unavoidable.

Things have immensely changed since, for example, King James made his laudable attempts to introduce a new and most valuable industry; at that date glass houses of anything like the extent we have them with us to-day could not have been dreamt of, and had they been, the dream could not have been realized by reason of the cost. Again, Science had not been invoked on behalf of the industry; Pasteur had not then lived to study the diseases of the industrious little insects, and, with his wondrous faculty of bacterio-physiological reasoning and genius for the discovery of pathological antidotes, put the industry upon a far less precarious footing. To-day applied chemistry has made glass so cheap, and machinery produces wrought woodwork at so low a price, that the aspect of the matter has become entirely changed. Our neighbour France—taking up this industry in a small way in 1521, when one Traucat, a working gardener, started the first nursery of white mulberry-trees—has continued to extend it until she is now the greatest silk-producing country in the world. During all this time not a pound of silk has been produced in our country commercially, though where is the British schoolboy—or schoolgirl for that matter—who has not produced his or her few ounces of the beautiful filaments?

If, therefore, Garden Cities could be instrumental in regard to further attempts to habitate the culture, with but a negligible financial risk, it is certainly

worth the trying. I do not advocate such a step as that taken in 1825—when a company with a million pounds capital, setting to work upon an entirely untried industry, involving untried arboricultural conditions, chose a most unsuitable site, and spent large sums in work-buildings intended for manufactures and the conversion of raw material of which they had not produced an ounce—but I do advocate an experimental test requiring not more than £100 or £200. The failure of previous attempts is practically summed up in the one sentence made use of by the historian: '*The trees were planted in many places, but the leaves did not ripen in sufficient time for the sustenance of the silkworms.*' Here, then, is the problem to which we have to apply ourselves!

It is obvious that one of two courses must be resorted to, either the trees must be forced or the *graine*—the eggs of the silkworm moth—must be delayed in incubation. It seems to me that both are within our reach, and this by very simple and economical means. When jolly King Hal—'that magnificent and expensive Prince'—drew on the first pair of silk stockings ever brought to this country, or when James VI. of Scotland, preparing to receive the ambassadors sent to congratulate him upon his accession to the throne of Great Britain, asked one of his lords to lend him his pair of silken hose, that he 'might not appear a scrub before strangers,' or, again, when Queen 'Bess' found soft silken hose at once so soft and elegant that she

vowed never again to don cotton, what would either of these monarchs have said had they been presented with a bunch of lilies of the valley, or narcissi, in the month of August, for example? Yet in modern horticulture we retard these beautiful natural products almost at will by the employment of refrigerating chambers, and I imagine that the retardation of the ova of the Antheræa will not present any serious difficulty.* Nor, on the other hand, would the forcing of the mulberry-bushes.

Let us for a few moments consider the practicability of my proposed experiment: One ounce of the eggs produces about forty thousand worms; these worms will produce 80 pounds to 120 pounds of cocoons, but of this weight 85 per cent. is due to the chrysalides, the balance of 15 per cent. being pure cocoon, so, to put it very safely, we may say that the 1 ounce of ova will produce 10 pounds of reeled silk. Now as to the expenditure! This industrious army of tiny silk-manufacturers will require during their first stage, or period up to first moulting, 6 pounds of leaves, during their second 18 pounds, during their third 60 pounds, during their fourth 180 pounds, and during their final 1,098 pounds, or a total of 1,362 pounds, of which they consume 772 pounds, the remainder (590 pounds) being represented by uncon-

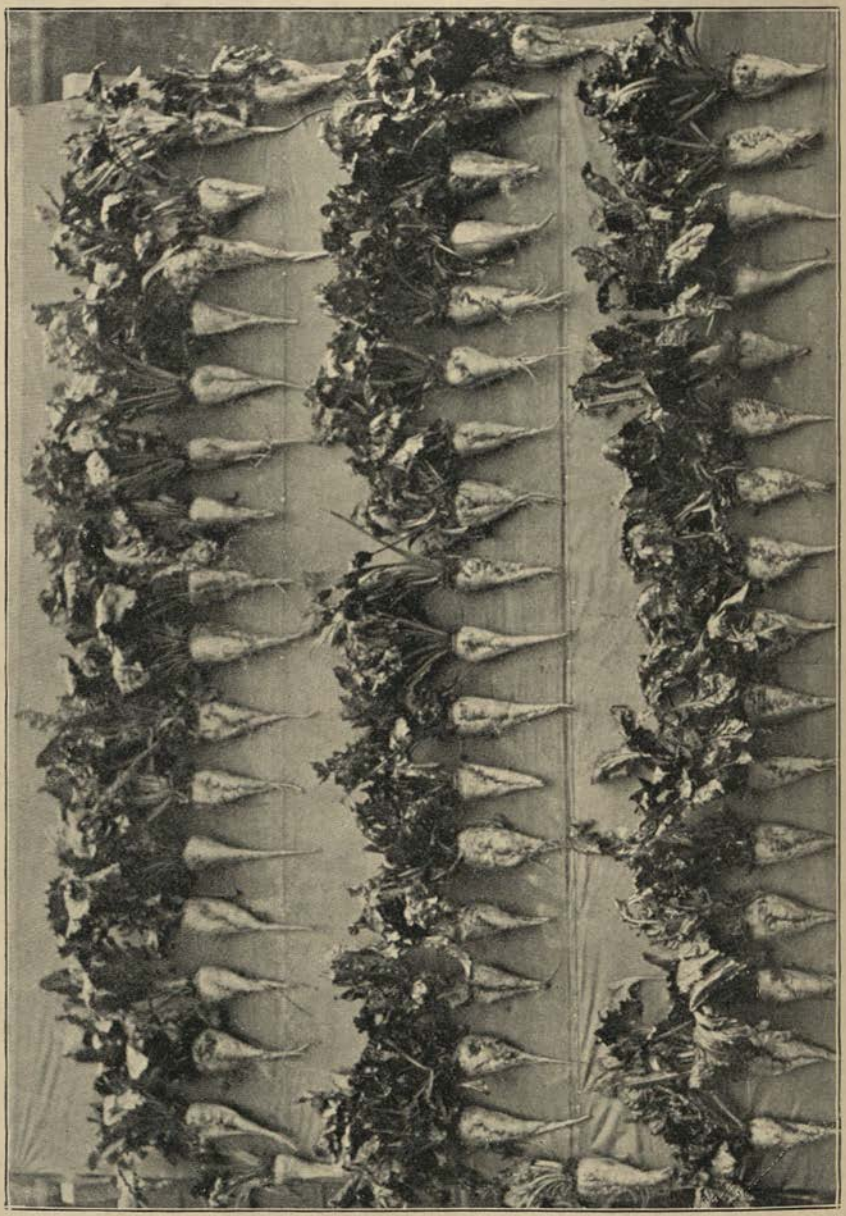
* Since writing the above, I learn that the requisite retardation by refrigeration has recently been quite successfully carried out in America.

sumed fragments removed in the litter. The mulberry-bushes are used for about twenty to twenty-five years; they are planted out at four years old, and the commencement of stripping of their leaves begins at five years old, when they yield about 1 cwt. of leaves, rising to 30 cwts. The ounce of eggs will require, in all, about 15 cwts. of leaves to give the 10 pounds of reeled silk; hence they will require the services of fifteen five-year-old bushes. Now, supposing that in Garden City there were only 10 acres of glass—in a single vineyard in the London suburbs one finds over 50 acres—this would give an aggregate length—taking the houses at 20 feet wide—of 21,780 feet, and, allowing 6 feet apart as the distance of the bushes growing, in a single row, along the centre walk of the houses, they would shelter 3,630 bushes. Now, the silkworms fed from these bushes would yield over a ton of reeled silk (2,420 lbs.) in the first year, and this silk would be worth about £2,200. The growth of their food—in an artificial climate as it were—would cost a merely nominal amount, for the glass-houses would be provided and utilized for other and highly remunerative purposes. The reason that silk manufacture has made continuous progress abroad, and has grown to such immense importance as an industry in France, Switzerland, and Italy, is due to no peculiarity of the industry *per se*, but merely to our obstinate continuance of a mistaken fiscal policy not adopted by those countries in which the industry

thrives. And it must be remembered that even up to to-day—though factory after factory continues to close its doors—every process connected with the industry is as successfully carried on in England as it is in France, Switzerland, and Italy from the time the silk filament is reeled off from the cocoon, with the sole difference that in Italy the cocoons themselves are produced, whilst we have to import them. Assuming—as we are fairly entitled to assume—that fiscal readjustment, by reason of the common-sense of our nation, is to be speedily effected, we have only two points to arrange to put ourselves in a position to commence the rebuilding of a vast, but now decadent, industry, the introduction of which was so patriotically and romantically made, and the national results at one time so important. The first point is the modification of our climatic conditions to suit the constitutions of the voiceless labourers. This, I trust I may have shown, is to-day easily and economically practicable. The other point is the discrepancy between British and Italian wages in the silkworm culture itself. And herein lies the real reason why, in the ordinary way of things, sericulture would not find a suitable field in England. It is because our operatives are too prosperous. Not only has sericulture been satisfactorily carried on in Nottingham, but elsewhere in these islands, and the reasons given—apart from the difficulty of mulberry-tree culture—have been untenable. The principal reason assigned was that the winding from the

cocoon being carried out in hot water, the occupation was unhealthy. Common-sense, of course, prohibits the acceptance of such a theory, especially in face of the facts that the process only occupies about one month in twelve; that it is carried out without demur with *imported cocoons.;* that, *ex necessitate rei*, it cannot be even so inimical to health as ordinary laundry work; and, moreover, one fails to detect any detrimental effect in regard to the health of the women workers one sees thus employed in Italy. The matter, therefore, resolves itself into one purely of wages. But it is here put forward as a means of employment of those who from physical disability or infirmity one would wish to afford employment to in a *quasi* charitable but effectively reproductive manner.

Whatever might be the value of the suggestion from a purely industrial point of view and as an industry of national importance, it would certainly appear to be a very suitable one for giving employment to women and children in a City where, by reason of the smallness in number of the inhabitants, philanthropic organization and administration could be so much more efficiently carried out. A difficulty which under ordinary circumstances would present itself is the fact that silkworm culture *per se* would occupy but a small proportion of the year. In a Garden City, where, as it is to be hoped, horticulture will hold a place of much importance, this could be conveniently adjusted.



Sugar-beet grown, with Sewage as Manure, upon the Corporation Farm at Liverpool.

GARDEN CITY INDUSTRIES (*continued*).

A New City and a New Industry—An Opportunity of National Importance for Garden Cities.

I HAVE elsewhere referred to a salient and very valuable feature of Garden Cities—the interweaving of factory industry with agriculture. Valuable though this undoubtedly is, there is nothing existing in our country at the present moment in any way comparable in national importance with the mutual interworking practicable in regard to a new industry recent events have rendered it now possible to introduce into Great Britain. The matter of this important innovation I will now venture to bring forward for the very earnest consideration of the reader. I refer to the cultivation of the sugar-beet in combination with the industries of sugar-making and sugar-refining.

It is very essential that the first Garden City should be a success, and—*ex necessitate rei*—anything in the nature of a pure experiment must be avoided. Happily, in this instance all the necessary experiments have already been made. Happily, more-

over, they have proved thoroughly and gratifyingly successful. I have spoken of *interweaving* and *interdependence;* the matter now under consideration is supremely typical of both. For the factory could not be run without the co-operation of the farmer, whilst the farmer could not dispose of his specific crop without the factory as his customer. This arises from the fact that in sugar-making, as in many other *quasi* chemical trades, certain by-products are produced, but, by a happy coincidence, in this instance all the by-products are of value to the farmer. Hence we find that in his relations with the factory he becomes both seller and buyer; in other words, he sells for cash, and takes back to his farm by-products which are of great service to him in further production.

To understand this we must consider for a moment the processes involved in sugar manufacture. Sugar may be divided into two classes—crystallizable and uncrystallizable. Of these, we are only concerned with the first, and this is derived either from the sugar-cane or from roots of various plants—beetroot, parsnip, carrots, and the like. The manufacture of 'cane-sugar' is venerable, having been known to the Chinese some 2,000 years, and to Europeans about 1,000 years. 'Beet-sugar' production is, on the other hand, a modern innovation. The root was first found to contain sugar by Sigmund Andreas Marggraf in 1747, and he published his important discovery in that year.

Another German chemist—one Achard—continued the investigations with great vigour, being in this helped by King Frederick William III. of Prussia, who, when the work of Achard had been brought to comparative perfection, had him rewarded by a gift of some 50,000 thalers (£8,000).

The success of the investigations had, of course, a great influence upon the cane-sugar planters of the colonies, who, it is said, approached Achard—in 1802—with an offer of £30,000 'if he would write and publish a book stating that all his works and investigations were erroneous, and that "beet-sugar" could never replace and be substituted for "cane-sugar."' The inventor, however, was too honourable to write against his convictions, and hence development proceeded, commencing with a single factory in Saxony in 1833, and continuing to grow until it has attained the enormous magnitude of our day—a vast industry in which, unhappily, we in Great Britain take no part.

It has been urged by many that the climate of England is not suitable for the cultivation of the sugar-beet. Happily, careful and exhaustive test and experiment have proved this to be a fallacy. To disprove the assertion Dr. Schack-Sommer, F.I.C., M.I.M.E., set on foot a number of tests by agriculturalists. These were continued by Mr. Sigmund Stein, who has assisted me in laying the important matter, in all its bearings, before the reader. Year after year, for a number of years, numerous experi-

ments have been carried out in all parts of England, and even in Scotland and Ireland, and through such work I trust the following pages will serve to eradicate the error from the minds of those who may read them. For the sake of clearness with terseness, I have recourse to a number of tables. From the first of these will be seen the number of these experiments carried out in each year. In the second table is given the average crop in tons per acre for each year. In the third we have the analysis of British-grown beets compared with the German-grown produce, also for a series of years; whilst in the last are reproduced some of the representative results for the last year of tests—viz., 1902.

TABLE 1.—EXPERIMENTS CARRIED OUT.

Year.	England.	Scotland.	Ireland.	Total.
1897	24	8	4	36
1898	180	39	33	252
1899	62	15	6	83
1900	58	1	36	95
1901	57	4	28	89
1902	31	9	2	42

TABLE 2.—AVERAGE YIELD PER ACRE.

Year.	Tons per Acre.	Year.	Tons per Acre.
1897 ...	... 16·07	1900 ...	... 19·01
1898 ...	... 16·03	1901 ...	... 19·04
1899 ...	... 16·09	1902 ...	... 15·90

TABLE 3.—ANALYSIS OF ROOTS.

Year.	Country.	Average Weight of Root with Leaves in Grammes.	Average Weight of Beet in Grammes.	Degrees Brix (Dry Matter).	Specific Gravity.	Quantity of Sugar in 100 Parts of the Juice.	Quantity of Non-Sugar in 100 Parts of the Juice.	Quotient of Purity.
1897	British	1,229	804	18·44	1·076	15·80	2·64	85·64
	German	1,143	561	17·81	1·074	15·07	2·74	84·05
1898	British	1,371	843	19·05	1·079	16·54	2·51	86·82
	German	974	539	19·02	1·079	16·32	2·70	85·80
1899	British	1,644	902	19·00	1·079	16·30	2·70	85·78
	German	957	611	18·30	1·076	15·45	2·85	84·42
1900	British	1,525	790	19·52	1·081	17·07	2·45	87·45
	German	1,064	557	20·00	1·083	17·38	2·62	86·90
1901	British	1,441	851	19·38	1·080	17·02	2·36	87·82
	German	1,112	621	17·66	1·073	14·76	2·90	83·53
1902	British	1,326	878	19·28	1·080	16·80	2·49	85·11
	German	1,042	492	17·43	1·072	14·79	2·64	82·74

The figures contained in these tables prove, not only that the sugar-beet *can* be grown in England, but that when grown it is actually superior to the foreign-grown product, possessing as it does a higher percentage of saccharine—the entity for which it is grown. Furthermore, it is superior in its quotient of purity and in the actual weight of the root, these valuable advantages being combined with the desired smaller percentage of 'non-sugar.'

It will be observed that the average crop may well be taken to be 16 tons of roots per acre, and this again compares very favourably with the

average crop obtained upon the Continent. Even this in all probability may be improved upon, and it may be interesting to mention that in Canada experiments have been recently carried out, with the result that an average crop of no less than 26 tons per acre has been obtained with seed sown early in May, and 23 tons with seed sown towards the end of May.

The best soil is one containing lime, or one of a clayey or loamy character with a proportion of sand. It should be a moist soil, but if subject to permanent moisture it is unsuited until after it has been properly drained. Needless, therefore, to say the necessary conditions abound all over our country.

The beet requires more attention and care than most root crops. The soil should be ploughed deep (10 to 12 inches) in the autumn, and then left till spring, when it is levelled and rolled. The seed should be sown from the middle of April to the beginning of May. This is done by machine or hand, six or eight grains being placed in holes 4 or 5 inches apart, and set in rows about 14 inches from one to the other. About 30 pounds of seed should be used to the acre. The time and manner of planting the seed practically determines the success of the crop. It must be done in dry weather, and as early as possible, so that the roots may have a full share of the autumn sunshine, as this greatly adds to the percentage of saccharine to be found in the root. On the other hand, if the soil has not

reached a proper temperature, the seed will not germinate with sufficient rapidity, and then the germ is liable to be destroyed by insects. It is found that, in an average year, the roots take from 140 to 150 days to reach maturity, but in bad years as long as 200 days have been found necessary.

As soon as the roots appear above the soil they should be hoed. This process is repeated twice, at fortnightly intervals, the second and third being deep hoeings. When the roots are $\frac{1}{4}$ inch thick, and show two pairs of leaves, they must be thinned. Naturally, the strongest-looking plants are left in, and these should be about 6 or 7 inches apart. This work is usually done by children.

After this hoeing and thinning, the roots should be left well banked up with earth. In the Canadian experiments it was found that if the root were covered with earth, so that none of it save the leaves was ever exposed, it made a considerable difference in the percentage of sugar. The roots should be kept free from surrounding weeds of every kind.

The crop should be ripe by the middle of September. The roots are then loosened with a long, narrow spade, taken up, and thrown into heaps. The heads are then sliced off, and the roots delivered to the sugar factory.

The following tables (Nos. 4 and 5) show the result of sugar-beet cultivation in the British Isles by the method above indicated:

TABLE 4.—RESULTS OF EXPERIMENTAL BEET-GROWING—1902.

Reference No.	Trials made by	Farming at	Nature of Soil.	Nature of Manure Used, and Quantity per Acre.	Length of Time.	Yield of Roots in Tons per Acre.
				ENGLAND.	Days.	
1	The Right Hon. the Earl of Lathom.	Crams Farm, Lathom, Ormskirk, Lancaster.	Strong loam, clay subsoil.	15 tons farmyard manure per acre, Ohlendorf's special beetroot manure, 2 cwt. being expended to the acre.	166	..
2	Liverpool Corporation -	Sewage Farm, Walton - -	Heavy soil, clay subsoil	Sewage - - - - - - - - -	174	18
3	" " -	" " - -	" "	" - - - - - - - - -	174	18
4	" " -	" " - -	" "	" - - - - - - - - -	174	18
5	W. J. C. Moens, J.P. - -	Tweed" Estate, "Holmfield, Lymington, Hants.	Sandy loam, sand subsoil, no lime.	20 loads of farmyard manure, 56 lb. sulphate of ammonia, 112 lb. dissolved bones, 224 gypsum, 112 soil.	149	19
6	" " -	" " - -	" "	Ditto. Ditto.	149	19
7	J. M. Scott " - - -	Crookes Farm, Crookes, Newent, Glos.	Soft loam, sand subsoil	30 loads of farmyard manure, 3 cwt. bone-dust, 2 cwt. superphosphate.	188	10
8	Rev. Edward Muckleston, M.A., Haseley Rectory.	The Glebe Farm, Haseley, Warwick.	Sandy soil, sand and gravel subsoil.	Guano from Ohlendorf - - - - -	146	19
9	John Woolston, J.P., Stamford.	Northfield Farm, Stamford -	Medium clay and limestone, mixed subsoil.	Ordinary farmyard manure, put in in the autumn, about 15 loads per acre.	154	18
10	E. C. Allen - - -	Digby Fen Farm, Highfield, Metheringham, Lincs.	Black soil, with clay subsoil.	5 cwt. Albert's basic slag, 2 cwt. superphosphate of lime.	151	18
11	" - - -	" "	" "	Ditto. Ditto.	151	18
12	The Right Hon. the Earl of Denbigh.	.. ..	.. ..	.. ..	..	..
13	" "	.. ..	.. ..	.. ..	..	..
14	" "	Brockhurst Farm, of Brockhurst, Lutterworth, co. Warwick.	Sandy loam, sandy subsoil.	12 cartloads of farmyard manure, 4 cwt. superphosphate, 1 cwt. sulphate of ammonia.	159	13
15	" "	Pailton Field Farm - -	Heavy loam, clay subsoil.	3 cwt. superphosphate, 1 cwt. sulphate of ammonia.	183	14
16	" "	High Cross Farm, High Cross, Lutterworth.	" "	10 tons farmyard manure, 3 cwt. superphosphate, 3 cwt. kainit.	182	20
17	" "	Manor House Farm, Manor House, Lutterworth.	Loam - - - - -	15 loads farmyard manure, 3 cwt. prepared bones, 3 cwt. basic slag, 1½ cwt. kainit, 1 cwt. nitrate soda.	183	17½
18	W. Aldridge, B.A. - -	The Experimental Plots, Shepton Mallet Grammar School.	Loam overlying lias clay and rocks.	Unmanured - - - - - - - -	191	17½
19	" - -	" "	" "	125 lb. nitrate of soda per acre - - -	191	20
20	" - -	" "	" "	375 lb. superphosphate per acre - - -	191	14¼
21	" - -	" "	" "	250 lb. kainit per acre - - - -	191	14¼
22	" - -	" "	" "	125 lb. nitrate soda and 375 lb. superphosphate per acre.	191	18½

23	,,	,,	,,	125 lb. nitrate soda, 375 lb. superphosphate, and 250 lb. kainit per acre.	191	19½
24	,,	,,	,,	375 lb. superphosphate, 250 lb. kainit per acre	191	21½
25	,,	,,	,,	125 lb. nitrate soda and 250 lb. kainit per acre	191	18½
26	,,	,,	,,	15 tons compressed sewage slutch	191	17½
27	,,	,,	,,	15 tons farmyard manure	191	18½
28	Prof. C. G. Freer-Thonger	The Colonial College, Hollesley Bay, Suffolk.	Medium loam alluvium	16 loads farmyard manure	199	12
29	George Capeling	Wallfield, near Bodelfarm, Brenzett, Kent.	Dark loam, clay subsoil	30 loads farmyard manure, 3 cwt. soda	209	30
30	C. F. Ellis	*Minster Lodge*, Ormskirk	Black soil	Horse manure	168	..
31	T. Thomas	West Royd Paddock, Formby-on-Sea, Lancs.	Sandy soil	10 tons horse manure, 3 cwt. special artificial compound manure.	168	47
				Average of the 31 Experiments in England	**160**	**16·05**
				SCOTLAND.		
32	West of Scotland Agricultural College	Holmes Farm, Kilmarnock, Ayr.	Light loam in good condition.	10 tons farmyard manure (in drills), 4 cwt. superphosphate (30 parts), 2 cwt. kainit, 1 cwt. sulphate of ammonia, 1 cwt. nitrate of soda, top dressed.	181	..
33	Alexander Leask	Oldmill of Shivas of Ellon	Stiff sandy soil, clay subsoil.	5 cwt. nitrate of ammonia, 10 cwt. soluble phosphate, 19 cwt. insoluble phosphate, 7 cwt. potash.	196	15
34	Peter Davidson	Strath Farm, Tertowie, Kinaldie, Aberdeenshire.	Black, with clay subsoil	7 tons turnip manure, 15 tons farmyard manure.	177	4½
35	George Cumming	Victoria Cottage, Drumoak, Aberdeenshire.	Black mould	10 tons farmyard manure	149	15
36	George Cooper	Farm of Candy, Glerach Estate of Crathie, Drumoak.	Old black soil	18 loads farmyard manure and 4 cwt. potatoes manure.	172	16·12
37	Robert Murray	Betty Field, County Roxburgh, Charterhouse, Kelso, N.B.	Medium light sandy subsoil.	Equal parts of saltpetre, kainit, and ground-lime, 10 tons farmyard manure.	168	..
38	Alexander Lowe	Cothill Farm, Woodside, Aberdeen.	Medium loam and light clay subsoil.	18 tons farmyard manure per acre and 4 cwt. beet manure.	169	6·16
39	David Pringle	Ednam Farm, Roxburgh, Kelso.	Sandy loam	15 cartloads farmyard manure, 5 cwt. dissolved bones.	150	17
40	William Milne	Haddo House Estate Farm, Milton of Fochel, Old Meldrum.	Black soil, soft red subsoil.	15 tons farmyard manure	191	..
				Average of the 9 Experiments in Scotland	**172**	**12·1**
				IRELAND.		
41	Right Hon. Lord Carew	Castle Boro' Home Farm, Enniscorthy, co. Wexford.	Light clay soil, gravel subsoil.	20 tons farmyard manure per statute acre, 6 cwt. bone manure per acre.	185	16
42	Charles McCoy	Ballyara, Tubbercurry, co. Sligo.	Fair loamy soil, gravel subsoil.	20 cartloads of farmyard manure per statute acre.	156	18
				Average of the 2 Experiments in Ireland	**170**	**17**

TABLE 5.—RESULTS OF ANALYSIS OF BEETS GROWN AS PER TABLE No. 4

Reference No.	Previous Crop.	Average Weight of Roots in Grammes.	Quantity of Sugar in 100 Parts of the Juice.	Quantity of Non-Sugar in 100 Parts of the Juice.	Percentage of Purity.	Average Weight in Grammes.	Quantity of Sugar in 100 Parts of the Juice.	Quantity of Non-Sugar in 100 Parts of the Juice.	Percentage of Purity.	Quantity of Sugar in 100 Parts of the Roots.	Average Weight in Grammes.	Quantity of Sugar in 100 Parts of the Juice.	Quantity of Non-Sugar in 100 Parts of the Juice.	Percentage of Purity.	Quantity of Sugar in 100 Parts of the Roots.	Average Weight in Grammes.	Quantity of Sugar in 100 Parts of the Juice.	Quantity of Non-Sugar in 100 Parts of the Juice.	Percentage of Purity.	Quantity of Sugar in 100 Parts of the Roots.
		F. O. Licht, Magdeburg.				Aderstedt.					Vilmorin Blanche.					Schlieckmann.				
1	Oats	496	14·75	2·75	84·29	912	18·60	3·10	85·71	17·90	..	..	..	..	..	..	..	..	..	..
2	Grass	496	14·75	2·75	84·29	1167	17·10	2·70	86·36	16·40	..	..	..	..	..	..	..	..	..	..
3	,,	496	14·75	2·75	84·29	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
4	,,	496	14·75	2·75	84·29	..	..	..	..	..	1344	17·90	2·90	86·06	17·00	..	..	..	..	..
5	Sugar-beet on the same plot for 25 years.	496	14·75	2·75	84·29	..	..	..	..	..	..	..	..	..	..	1444	19·30	2·40	88·94	17·90
6	,, ,,										977	18·80	2·10	89·95	18·10	..	..	..	..	..
7	Wheat	496	14·75	2·75	84·29	866	18·80	2·90	86·63	18·20	..	..	..	..	..	..	..	..	..	..
8	Oats	496	14·75	2·75	84·29	..	..	..	..	..	888	16·90	2·20	88·43	16·30	..	..	..	..	..
9	Wheat	496	14·75	2·75	84·29	..	..	..	..	..	967	19·70	2·30	89·50	18·90	..	..	..	..	..
10	,,	496	14·75	2·75	84·29	924	17·60	2·20	88·85	17·00	..	..	..	..	..	..	..	..	..	..
11	,,	496	14·75	2·75	84·29	867	17·10	2·70	86·36	16·40	..	..	..	..	..	..	..	..	..	..
12	..	554	17·50	2·50	87·50	..	..	..	..	..	..	..	..	..	..	837	17·90	2·90	86·66	17·00
13	..	554	17·50	2·50	87·50	..	..	..	..	..	..	..	..	..	..	788	17·90	2·50	87·74	17·00
						Klein Wanzleben.					Vilmorin Rose.									
14	Oats	554	17·50	2·50	87·50	801	17·40	2·30	88·33	16·70	..	..	..	..	..	..	..	..	..	..
15	Wheat	554	17·50	2·50	87·50	866	17·20	2·40	87·75	16·50	..	..	..	..	..	..	..	..	..	..
16	Vetches	554	17·50	2·50	87·50	944	17·80	2·60	87·25	17·10	..	..	..	..	..	..	..	..	..	..
17	Oats	554	17·50	2·50	87·50	912	16·60	2·20	88·29	16·00	..	..	..	..	..	..	..	..	..	..
18	Wheat	496	14·75	2·75	84·29	785	16·90	2·40	87·56	16·20	..	..	..	..	..	..	..	..	..	..
19	,,	496	14·75	2·75	84·29	..	..	..	..	..	771	17·20	2·90	85·57	16·60	..	..	..	..	..
20	,,	496	14·75	2·75	84·29	..	..	..	..	..	744	15·80	2·10	88·26	15·30	..	..	..	..	..
21	,,	496	14·75	2·75	84·29	..	..	..	..	..	990	17·80	2·30	88·20	16·60	..	..	..	..	..
22	,,	496	14·75	2·75	84·29	..	..	..	..	..	826	16·80	2·60	86·54	16·20	..	..	..	..	..
	,,	496	14·75	2·75	84·29	..	..	..	..	..	929	17·20	3·00	85·14	16·40	..	..	..	..	..

23	Wheat	496	14·75	2·75	84·29	..	..	..	..	..	844	16·80	2·90	35·27	16·00	..	..	..	..	..
24	,,	496	14·75	2·75	84·29	..	..	..	..	..	826	16·00	2·50	86·48	15·50	..	..	..	..	..
25	,,	496	14·75	2·75	84·29	..	..	..	..	..	774	19·20	2·40	88·88	18·40	..	..	..	..	..
26	,,	496	14·75	2·75	84·29	..	..	..	..	..	927	18·40	2·20	89·32	17·70	..	..	..	..	..
27	,,	496	14·75	2·75	84·29	..	..	..	..	..	931	16·30	2·60	87·24	15·70	..	..	..	..	..
28	,,	496	14·75	2·75	84·29	..	..	..	..	..	888	17·10	2·90	85·50	16·30	..	..	..	..	..
						Schreiber.								Breustedt.						
29	Beans	496	14·75	2·75	84·29	1257	16·50	2·20	88·23	15·90	..	..	..	..	..	..	..	..	..	..
30	Potatoes	496	14·75	2·75	84·29	887	18·30	2·60	87·56	17·50	..	..	..	..	..	..	..	..	..	..
31	Sugar-beet	496	14·75	2·75	84·29	..	..	..	..	..	1031	16·80	2·60	86·55	16·10	..	..	..	..	..
		..	..	..	..	**901**	**16·88**	**2·46**	**84·53**	**16·19**	..	..	..	..	..	..	..	..	..	..
						Schlieckmann.								Vilmorin Blanche.						
32	Oats	496	14·75	2·75	84·29	991	16·80	2·30	87·95	16·00	..	..	..	..	..	..	..	..	..	..
33	,,	496	14·75	2·75	84·29	..	..	..	..	..	592	17·20	2·20	88·65	16·60	..	..	..	..	..
34	,,	496	14·75	2·75	84·29	..	..	..	..	..	642	17·30	2·90	85·64	16·30	..	..	..	..	..
35	Corn	496	14·75	2·75	84·29	..	..	..	..	..	799	14·90	2·20	87·13	14·30	..	..	..	..	..
36	Oats	496	14·75	2·75	84·29	..	..	..	..	..	693	17·30	2·30	88·26	16·40	..	..	..	..	..
37	,,	496	14·75	2·75	84·29	..	..	..	..	..	733	16·30	2·90	84·89	15·40	..	..	..	..	..
38	,,	496	14·75	2·75	84·29	..	..	..	..	..	973	18·00	3·30	84·50	17·10	..	..	..	..	..
39	,,	496	14·75	2·75	84·29	..	..	..	..	..	774	15·30	2·50	85·95	14·10	..	..	..	..	..
40	Turnips	496	14·75	2·75	84·29	..	..	..	..	..	986	16·80	2·40	87·50	16·20	..	..	..	..	..
		..	..	..	..	**798**	**16·65**	**2·55**	**86·71**	**15·32**	..	..	..	..	..	..	..	..	..	..
						Vilmorin Rose.								Aderstedt.						
41	Early potatoes	496	14·75	2·75	84·29	955	17·60	2·70	86·69	16·80	..	..	..	..	..	..	..	..	..	..
42	Turnips	496	14·75	2·75	84·29	..	..	..	..	..	817	18·20	2·70	87·08	17·30	..	..	..	..	..
	Average of the 42 Experiments in the United Kingdom in the Year 1902															**878**	**16·80**	**2·49**	**85·11**	**16·15**
	Compared with German grown roots according to Mr. F. O. Licht, Magdeburg, in the Year 1902															**492**	**14·79**	**2·64**	**82·74**	..

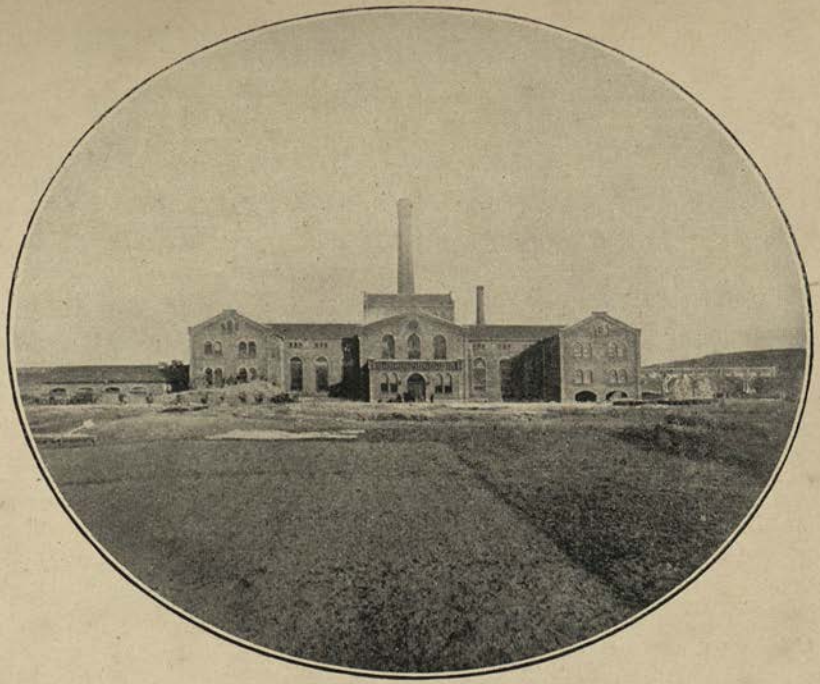
Beetroot undoubtedly takes from the soil a large quantity of food substances, but of these, as the following table serves to show, the greater part is contained in the leaves.

TABLE SHOWING FOOD SUBSTANCES EXTRACTED FROM THE SOIL BY 1,000 POUNDS OF BEET AND LEAVES RESPECTIVELY.

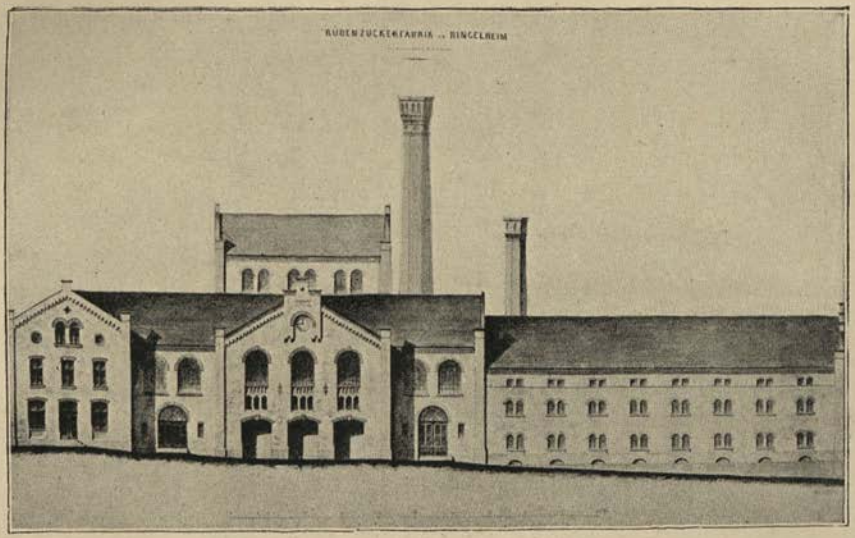
Food Substances.	Beets.	Leaves.
	Pounds.	Pounds.
Nitrogen	1·5	4·0
Magnesia	0·7	2·6
Phosphoric acid ...	1·0	1·5
Potassium	3·5	5·9
Lime	6·8	16·3
Totals	13·5	30·3

If the sliced-off heads and leaves be ploughed into the land, however, the impoverishment of the soil, it has been found, is reduced in the proportion of the food ingredients contained in them. Against this, it has been usual on the Continent to use these as foodstuffs for cattle, with considerable benefit, and to make up the loss by ploughing in the requisite extra amount of manure.

The matter of the most suitable manures to be employed in beet-growing is one requiring proper consideration. It is to be remembered that the amount of nitrogen influences the amount of the crop per acre, phosphoric acid affects the quotient



A Continental Sugar Factory standing on its Farm.



A Modern Sugar Factory.

1036 C

of purity, whilst potassium is in a certain ratio to the saccharine richness of the roots.

The farmer, having hauled his crop of beets, cuts off their heads, thus securing the first by-product, for these are good for feeding cattle. He then delivers his crop to the factory, where, during the process of manufacture, they are sliced into very fine slices. Of these the farmer subsequently receives back nearly a quarter—after the saccharine matter has been expressed—equivalent to some three tons for each acre's crop, and this is a most valuable feeding-stuff. In a subsequent process the saccharine liquor is treated with lime, and a residuum—called lime-cake, or saturated lime—is produced, and this the farmer also takes and uses as manure.

The interweaving of this great and interesting industry with agriculture to which I have referred is, of course, dependent upon whether the growing of beet will prove profitable to the farmer. Happily, again, the long series of tests prove this most satisfactorily and conclusively. The question is answered in a practical manner by the results obtained, not only in a single year, but by those obtained from cultivation year after year; and these not confined to one or two growers, but to a number of eminent agriculturists, and to land spread over a great area of our country—land extending hundreds of miles farther north than the latitude above which we were gravely told beet culture would be an impossibility. In the two following tables, the first

gives the cost per acre of sugar-beet growing, whilst in the second is seen the return from beet crops of 15 tons to the acre.

COST OF GROWING SUGAR-BEET PER ACRE.

	£	s.	d.
Rent and taxes	2	0	0
Clearing and forking weed stubble	0	1	0
Ten loads of farmyard manure	1	10	6
Carting 10 loads of fresh manure ...	0	5	6
Spreading manure	0	1	0
Ploughing 9 to 11 inches deep	1	0	0
Cultivating, including harrowing and rolling	0	6	6
Artificial manure	1	10	0
Sowing	0	2	6
Seed—30 pounds	0	12	0
Drilling	0	1	0
Hoeing and thinning	0	10	6
Harvesting	0	12	9
Carting to factory—15 tons, three miles, at 6d. per mile per ton, and 3d. per ton labour	1	6	3
	9	19	6

Or say £10 per acre.

PROFIT AND LOSS ACCOUNT PER ACRE.

DR.	£	s.	d.	CR.	£	s.	d.
Cost per acre to plant, cultivate, harvest, and deliver roots ...	10	0	0	Receipts for roots, 15 tons, at 18s. per ton ...	13	10	0
Profit per acre ...	6	10	0	Value 5 tons leaves and heads from roots	1	5	0
				Three tons slices, 20 per cent. of quantity delivered, at 10s.	1	10	0
				Value saturation lime	0	5	0
	16	10	0		16	10	0

The price here quoted—viz., 18s. per ton—is a fair average price for sugar beetroot. Now, at this figure we see that from these alone the farmer makes £3 10s. 0d. per acre profit; but, according to Mr. Stein, the value of the heads and leaves as feeding-stuffs is 25s., that of the slices, returned free from the factory, 30s., and that of the saturated lime for manure 5s. It is unquestionable that these heads, as well as the thin slices of beet remaining after the sugar has been extracted, have great value as feeding-stuffs for cattle. This fact has been demonstrated, both experimentally and in actual farming, in every part of the Continent. It is a convenient food also, for the leaves may be compressed—with or without salt—and kept for many months as winter food, the slices also being obtainable from the factory during the winter months, when fodder is at its dearest. The feeding of cattle in combination with sugar-beet growing, it must be mentioned, gives the necessary amount of manure required for the crop.

Moreover, the deep ploughing and careful culture, together with the necessity for proper manuring, required by the sugar-beet field increase the cultivative value of the land for all succeeding crops.

Although, for the sake of safety, the average crop has been taken in the tables at only 15 tons per acre, there is little doubt that with proper attention to such points as the seed best suited to the district, the time of planting, and the hoeing processes, much

better average crops can without difficulty be produced.

Thus it will be seen that there is an interweaving of the interests of cultivator and converter, of farmer and manufacturer, beneficial to each, and also to the Garden City, if this be laid down upon scientific lines, as I have ventured to suggest. For the manufacturer requires much heat for boiling and evaporating: this the City would supply him in the form of cheap gas (see Chapter IX.). But the farmer requires far more manure than the 'lime-cake' affords, and this the City could supply him in the form of sulphate of ammonia, one of the by-products in the manufacture of their gas.

It is also to be assumed that Garden Cities would have their sewage farms, and these run upon the best and most modern principles. In this case, again, an interweaving could be effected, the requisite trials having already been carefully and exhaustively carried out by the city of Liverpool, under the able supervision of Mr. John A. Brodie, the city engineer. The proceeds of some of this sewage-assisted cultivation are enabled, so to say, to speak for themselves by means of their photographs, forming the frontispiece.

Sewage disposal in inland towns is a problem increasingly absorbing the attention of engineers, and it is therefore most gratifying to find the highly satisfactory measure of success which has attended sugar-beet culture on sewage farms. The

results of beet culture by means of sewage at Liverpool are embodied in the table No. 6. A noticeable feature of the table is the enormous increase in the weight of the crop, whilst a gratifying feature is that, despite the great increase in weight of roots, the percentage of sugar yield should remain so very satisfactory.

Sugar-beet has also been very successfully grown on other sewage farms, amongst them Oxford and Malvern. It has also been satisfactorily grown on other lands, using sewage as manure. The results of some of these experiments are given in Table No. 7.

These tables show there has been a steady increase in the size of the roots, and in the percentage of sugar in every 100 parts of the roots, from 1898 up to the present date. The frontispiece to this section shows a group of the monster roots raised in 1902 —a *bad* season. The Oxford sewage farm also produced in 1898 a series of really gigantic roots (see weights in Table 7).

The experiments made at the Grammar School, Shepton Mallet, in 1901 and 1902 are as interesting as they were successful. In the latter year no less than ten experimental plots were cultivated by Mr. W. Aldridge, B.A., at this school, all under varying conditions of manure; the results being good, both as to weight of crop, weight of root, and sugar percentage. Were we to teach our rising generation the best way to raise this crop, and show them

TABLE 6.—RESULTS OF BEET CULTURE UPON THE LIVERPOOL SEWAGE FARM.

Year.	Soil.	Manure.	Duration of Growth.	Crop (Tons per Acre).	Weight of Roots in Grammes.	Percentage of Sugar.	Percentage of Non-sugar.	Quotient of Purity.	Seed used.
			Days.						
1898	Clayey	Sewage	153	33	578	13·50	2·10	86·54	Klein, 'Vilmorin.'
	"	"	153	26	846	14·60	2·50	85·38	Aderstedt, 'Original.'
	"	"	153	32	624	16·80	2·40	87·50	Klein, 'Wanzleben.'
	Garden soil ..	10 tons horse manure	134	34	816	15·00	2·40	86·20	Klein, 'Vilmorin.'
	" " ..	" "	134	28	784	16·10	2·30	87·50	Aderstedt, 'Original.'
	" " ..	" "	134	32	419	13·80	2·40	85·17	Klein, 'Wanzleben.'
	Strong land, clay subsoil.	Sewage	206	34	1,070	18·80	2·80	87·04	Klein, 'Vilmorin.'
	"	"	206	26	835	18·00	3·70	82·95	Aderstedt, 'Original.'
	Light "land," sand subsoil.	"	206	28	973	18·50	2·40	88·51	Klein, 'Vilmorin.'
	" "	"	206	34	1,131	19·70	2·90	87·17	Aderstedt, 'Original.'
	Strong, heavy land	10 tons horse manure and sewage.	128	30	390	13·90	2·20	86·33	Janasz, 'Zuckerreiche.'
	" "	" "	128	32	587	14·30	2·30	86·14	Braune, 'Vilmorin.'
	" "	" "	128	24	381	14·30	2·10	87·19	Sutton (English seed).
	" "	" "	168	26	833	15·30	2·60	85·46	Janasz, 'Zuckerreiche.'
	" "	" "	168	29	991	16·50	3·00	84·61	Braune, 'Vilmorin.'
	" "	" "	168	36	749	17·70	2·60	87·19	Sutton (English seed).
	Medium light land	15 tons horse manure; no sewage.	134	28	369	15·80	2·60	85·86	Janasz, 'Zuckerreiche.'
	" "	" "	134	24	617	14·60	2·70	84·39	Braune, 'Vilmorin.'
	" "	" "	134	26	548	9·80	2·80	77·77	Sutton (English seed).
	" "	" "	184	29	600	16·10	2·40	87·03	Janasz, 'Zuckerreiche.'
	" "	" "	184	26	615	19·00	2·90	86·75	Braune, 'Vilmorin.'
	" "	" "	184	32	537	16·90	2·20	88·48	Sutton (English seed).
	" "	10 tons horse manure; no sewage.	134	28	986	12·00	2·60	82·19	Braune, 'Wanzleben.'
	" "	Sewage	184	36	426	14·20	2·10	87·11	" "
	" "	10 tons horse manure; no sewage.	184	30	745	18·60	2·50	88·15	" "
	" "	Sewage	184	41	972	17·90	2·40	88·17	" "
1900	Medium light sand subsoil.	Ordinary sewage ..	148	12	918	17·00	2·40	87·68	Brenstedt.
	" "	" " ..	148	12	888	19·40	2·30	89·40	Aderstedt.
	" "	" " ..	148	16	746	18·20	2·40	88·35	Schlieckmann.
	" "	" " ..	148	18	976	17·40	2·50	87·44	Vilmorin, 'Blanche.'
	Dark soil, sandy subsoil.	Sewage during winter months; not treated with sewage when growing.	157	28	867	17·70	2·40	88·06	Brenstedt.
	" "		157	15	945	16·40	2·50	86·77	Aderstedt.
	" "		170	22	1,042	17·30	2·20	88·72	Schlieckmann.
	" "		157	15	795	15·50	2·30	87·07	Vilmorin, 'Blanche.'

TABLE 6.—RESULTS OF BEET CULTURE UPON THE LIVERPOOL SEWAGE FARM—*continued.*

Year.	Soil.	Manure.	Duration of Growth.	Crop (Tons per Acre).	Weight of Roots in Grammes.	Percentage of Sugar.	Percentage of Non-sugar.	Quotient of Purity.	Seed used.
			Days.						
1901	Dark soil	Sewage	191	45	963	18·70	2·50	88·20	Vilmorin.
	,, ...	,, ...	191	38	1,147	17·00	2·40	87·63	,,
	,, ...	,, ...	191	41	914	18·30	2·60	87·56	Schlieckmann.
	,, ...	,, ...	191	43	900	18·20	2·40	88·35	Braune, 'Elite.'
1902	Heavy soil, clay subsoil.	,, ...	174	18	1,167*	17·10	2·70	86·36	Aderstedt.
	,, ,,	,, ...	174	18	1,344*	17·90	2·90	86·06	Vilmorin, 'Blanche.'
	,, ,,	,, ...	174	18	1,444*	19·30	2·40	88·94	Schlieckmann.

* These are the ones shown in the illustration.

TABLE 7.—EXPERIMENTS IN BEET CULTURE, USING SEWAGE AS A MANURE.

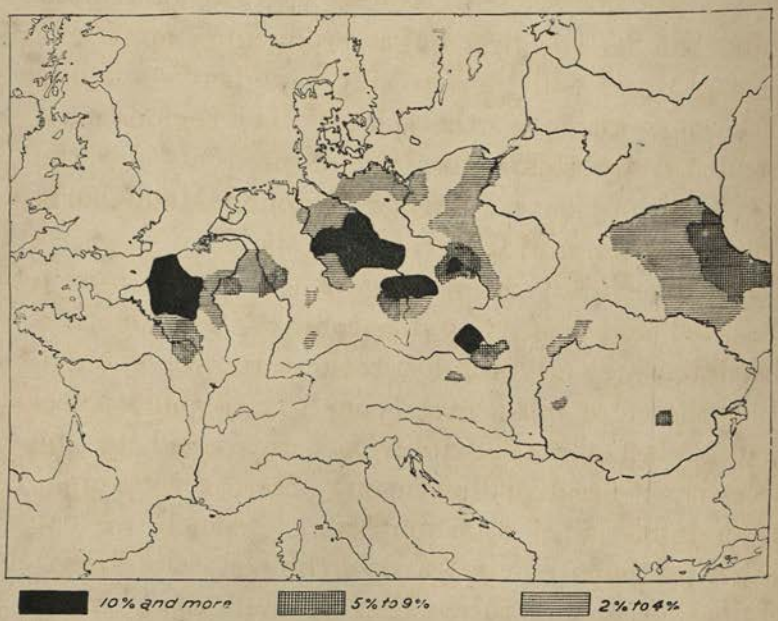
Year.	Farm.	Soil.	Manure.	Duration of Growth.	Crop (Tons per Acre).	Weight of Roots in Grammes.	Percentage of Sugar.	Percentage of Non-sugar.	Quotient of Purity.	Seed used.
				Days.						
1898	Oxford Corporation.	Sandy ..	Sewage ..	181	36	1,792	16·60	2·20	88·29	Brenstedt, 'Elite.'
	,, ,,	,, ..	,, ..	181	36	2,941	14·70	2·40	85·95	Klein, 'Wanzleben.'
	,, ,,	,, ..	,, ..	181	34	2,617	15·20	2·60	85·38	Schlieckmann.
	,, ,,	,, ..	,, ..	181	41	2,460	16·40	3·00	84·54	Simon Legrand, 'Blanche.'
	Malvern Council House.	Loam, gravel subsoil.	,, ..	142	34	1,492	14·50	2·60	84·79	Janasz, 'Zuckerreiche.'
	,, ,,	,,	,, ..	142	32	1,586	14·50	2·40	85·78	Simon Legrand, 'Blanche.'
	Redding Farm, Upminster, Essex.	Stiff loam	20 loads sewage, 4 cwt. superphosphate of lime, nitrate of soda and kainite.	143	28	618	15·40	2·60	85·55	Vilmorin, 'Blanche.'
	,, ,,	,,		143	18	594	13·70	2·70	83·54	Schreiber, 'Klein Wanzleben.'
	Lower Edmonton.	Heavy clay subsoil.	Sewage ..	184	21	1,545	13·80	2·40	85·18	Schreiber, 'Klein Wanzleben.'
1901	Shepton Mallet	Loamy ..	Sewage sludge	180	14	946	17·50	2·60	87·60	Vilmorin, 'Blanche.'
1902	,, ,,	,,	15 tons compressed sewage sludge.	191	17½	927	18·40	2·20	89·32	,, ,,

how profitable it can be made, we should make a vast stride towards regaining our old agricultural prosperity.

In the tables will be found a reference to beet-growing by a great agricultural authority, Mr. W. Moens, of Lymington, Hants. This gentleman has kindly furnished me with interesting data, to which I refer in considering the question of allotments, but I should like here to refer to his view of the wisdom and practicability of fostering beetroot cultivation. Writing under date October 23, 1903, this authority says: '*Sugar-beet industry should certainly be introduced into this country.* I have grown the roots *for over thirty years*, principally for my cows, and the crop has never failed. The result has been from over 16 to 19 per cent. saccharine matter. In France the roots are bought by the sugar people according to the percentage, and the value runs up to over £2 per ton of roots. The cultivation is the same as that of red garden beet, and costs rather more than that of mangolds, as the rows and plants are closer together. Even this bad season I have a good crop.'

The manufacture of beet-sugar, protected by export bounties in the Central European States, rose into importance at the expense of the old cane-sugar from tropical and subtropical countries, which at one time prevailed throughout the world. In the year 1888 these two main sources of the sugar supply were almost equal, each producing about 2,500,000

The Sugar Production of the World.



Distribution of Growth of the Sugar-beet in Centra Europe.

tons. In 1896-1897, however, beet-sugar brought into the markets of the world 4,800,000 tons, and cane-sugar only 2,400,000. In regard to these figures, it may be interesting to mention the views of an able continental political economist, Professor Partsch, of the University of Breslau. Dr. Partsch says: 'This development, attained almost entirely by the exertions of Central Europe, is now suddenly threatened with hindrances and reverses, owing to the appearance on the scene of the United States as a keen competitor. To the old sugar districts of Louisiana, Cuba, and Porto Rico, Hawaii and the Philippines are now being added, lands well adapted to this industry, which was formerly pursued in them with success. In a few years the United States will be the first sugar-producing country in the world, and will be powerful enough to set limits to the sugar trade of other places. The regions most threatened by this alteration of products are the most fertile of Central Germany, around Magdeburg, Central Silesia, and Central Bohemia.'

This is certainly interesting, as emanating from a protected and bounty-giving country, yet doubtless the statement and prognostication are true enough. It is therefore most gratifying to be able to feel that at last Great Britain has awakened to the necessity of fiscal readjustment. Here, for example, is an industry of vast importance, which we can either participate in or leave for the benefit of foreign nations, according to whether we shall view matters

in the light of common-sense, or continue to be swayed by weak sentimentality and progress-arresting regard for obsolete laws and time-proved unworkable principles.

The interworking could, perhaps, be followed more easily if I give, in a few words, an outline of sugar manufacture. The beetroots, delivered by the farmer to the factory, are stored in a shed till required, and are then taken to a washing-machine (Fig. 1), where they are freed from the adhering earth and dirt. After washing, they are lifted by an elevator to the beetroot slicing-machine (Fig. 2). In this machine, which contains a special form of knife, the beetroot is cut into small slices (like vermicelli), which are put into large cylinders called diffusers (Fig. 3). Twelve to fifteen of such diffusers are placed in a circle, or in two rows, and by these the sugar contents are extracted from these beetroot slices with tepid water under pressure.

This process is now so perfect that only about 0·2 per cent. of sugar remains in the exhausted beetroot slices. These slices are then placed in a press, where they are freed from the greater part of the water they contain (Fig. 4).

The liquor thus extracted from the slices is called raw juice, and this immediately becomes black on exposure to the atmosphere. The raw juice is put into a vessel and treated with about 2 per cent. of lime. This liming process is to get rid of the organic impurities which are in the raw juice.

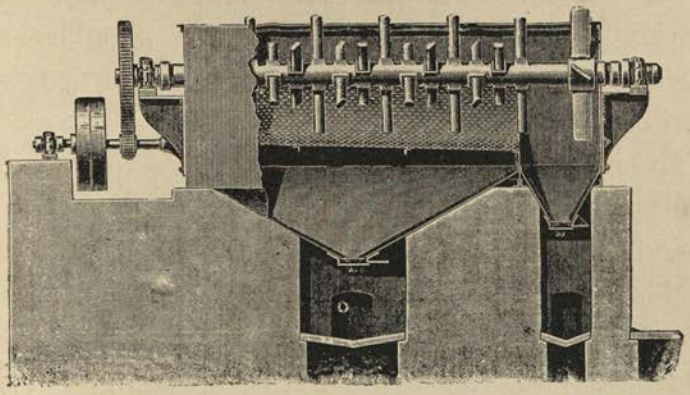


Fig. 1.—Beetroot-washing Machine.

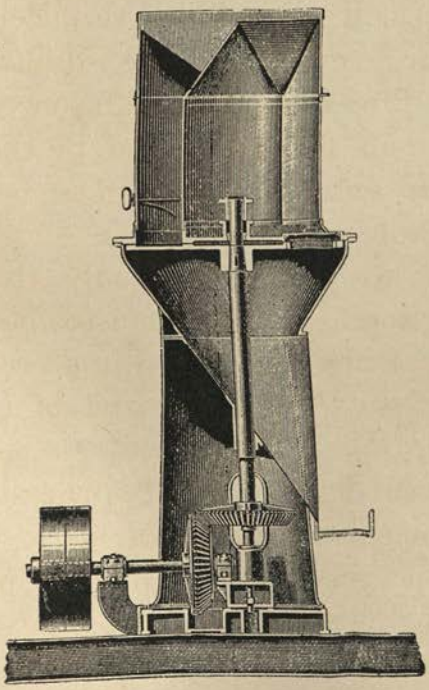


Fig. 2.—Slicing Machine.

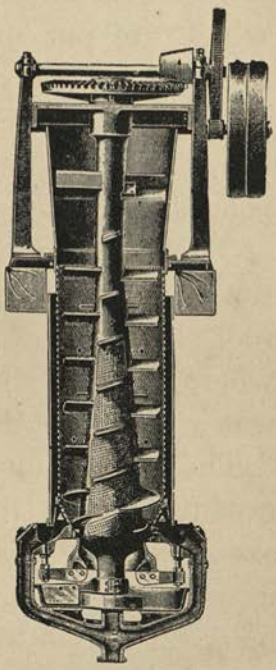


Fig. 4.—Slice Press.

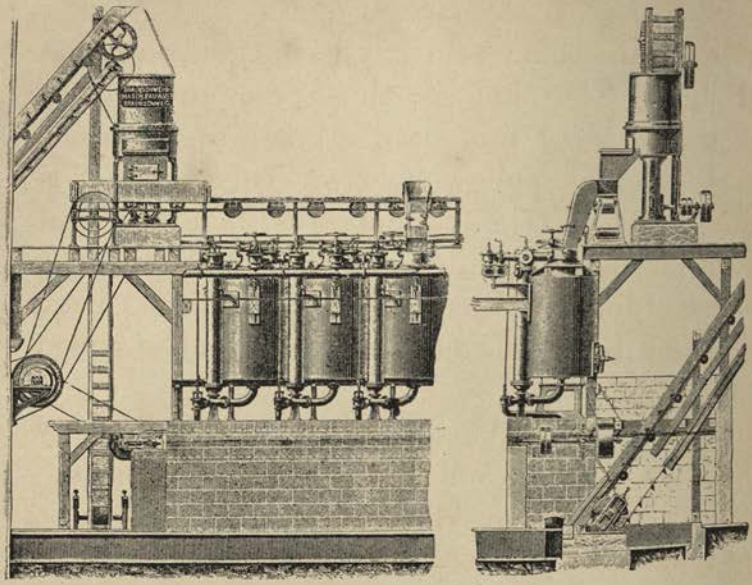


Fig. 3.—Diffusers—with Mechanical 'Conveyers' for bringing the Beet Slices.

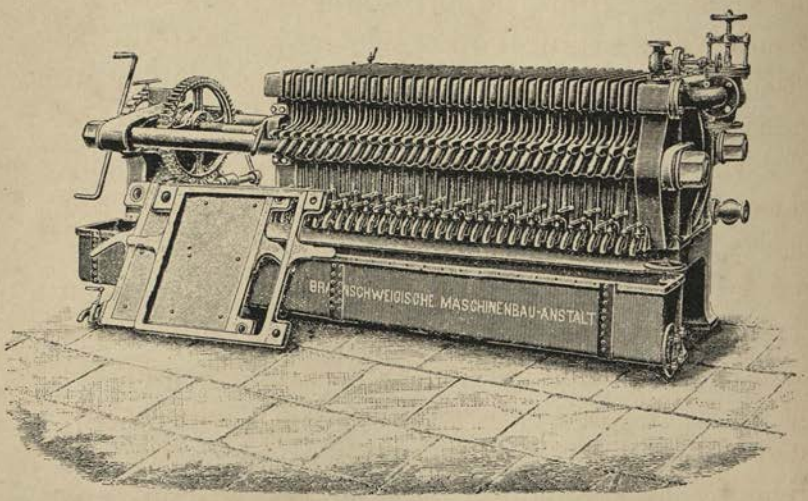


Fig. 5.—Filter Press

After this, carbonic acid gas is pumped into the limed juice. The lime is thus precipitated and forms carbonate of lime, whilst the sugar liquor becomes a bright yellow colour. This process is called saturation. The precipitate is then separated from the liquor in a filter-press (Fig. 5), and the carbonate of lime remains as a cake, which, as I have said, is used by the farmer as manure and is called saturation lime.

The liquor is subsequently treated in a similar way with smaller quantities of lime until all organic impurities are removed. After the last saturation the liquor is again filtered and treated with sulphurous acid (SO_2), after which it is again filtered to remove the sulphide of lime which this treatment has produced. The clear liquor which runs off from this last filtration is called 'thin' liquor, and gauges 5° to 8° Beaumé. This thin liquor is evaporated in a specially-arranged series of vacuum pans (similar to Fig. 6) to a concentration of 28° Beaumé. This so-called thick liquor is then boiled to crystals in the ordinary vacuum pan (Fig. 6), and the contents are called *masse cuite*. *Masse cuite* contains the sugar crystals, floating in a syrup or mother-liquor. The crystals are separated from the mother-liquor by a centrifugal machine plant (Fig. 7 and 8), and are washed with water, steam, or perfectly clear saturated liquor. Modern centrifugal machines are driven by electric or hydraulic motors, without any shafting, belting, etc., and are emptied from the

bottom, from which the sugar falls on a travelling belt or conveyer, by which it is transported to a suitable warehouse, where, after having been allowed to cool and dry, it is packed into bags, and is then ready for consumption.

This brings us up to most important considerations, considerations concerning one of the most important industries in the world, an industry which would be quite new to our country, the manufacture of sugar. In this connection the reader will be good enough not to confound sugar-*making* with sugar-refining, for the latter was once with us, a thriving industry, giving employment to many hands, but subsequently this was allowed to be stamped out from our national industries by our hands being tied—through an absurd sentimentality concerning an old and, as time proved, erroneous enactment—whereby we were obliged to stand quiescent and see, by means of an iniquitous 'bounty' system, the factories, one after another, forced to close their doors.

Now let us consider the profits arising from sugar-manufacture. Here, again, through the co-operation of Mr. Stein—who himself is in an unique position, by reason of his having formerly occupied the position of manager in some of the most important sugar factories upon the Continent—I am enabled to bring forward most satisfactory and indisputable figures—figures which go to show that, as a result of the recently-arrived-at Sugar Bounty Convention, we have placed, as it were, into

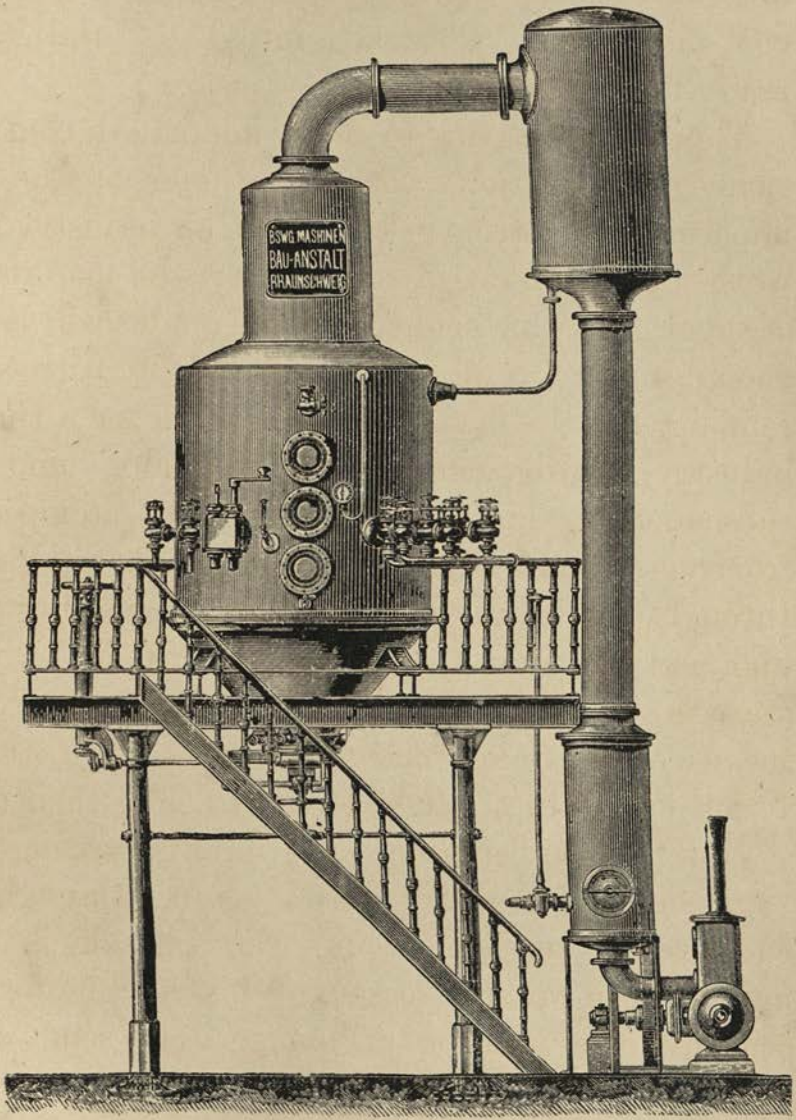


Fig. 6.—Vacuum Evaporating Pan.

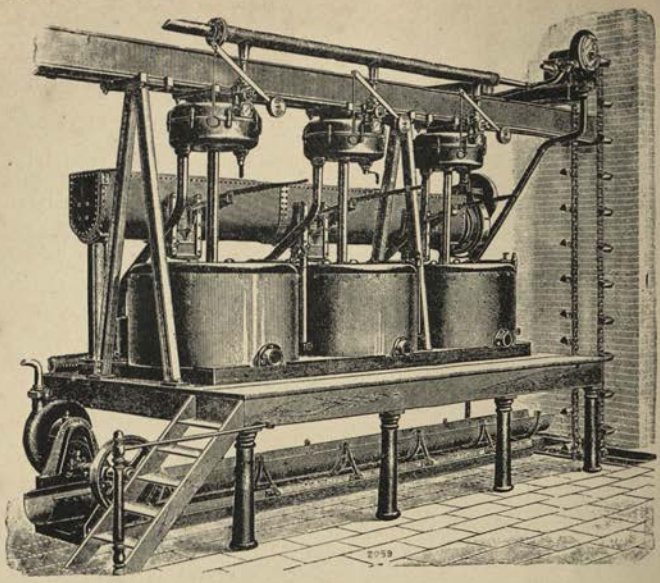


Fig. 7.—Crystal Extractors driven by Hydraulic Motors and having Suspended 'Baskets.'

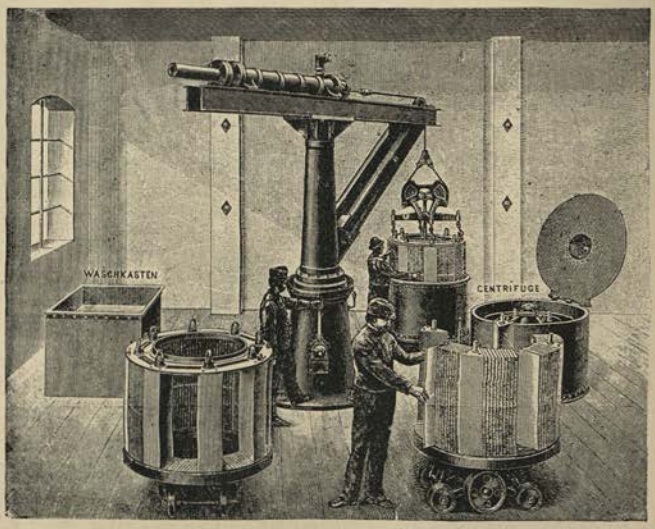


Fig. 8.—Centrifugal 'Cube' Sugar-making Plant.

(Here the 'cage' is driven from below and withdrawn by the hydraulic lift and revolving crane seen in the centre.)

our hands the power, not only of recrudescing sugar refining, but of entering forthwith into the profitable manufacture of sugar. In this connection, it would be indeed gratifying if its inception were brought about *pari passu* with the inception of the first Garden City.

The cost of sugar-making works out as follows:

		£	s.	d.
Fuel, 12 per cent. coal at 7s. per ton		0	0	10
Wages:				
First process—preparative		0	0	8
Second process—completive		0	0	10
Limestone, 4 per cent., at 6s. per ton delivered ...		0	0	3
Coke	2·30d.			
Leather and filter cloth	0·60			
Bags	1·92			
Oil and grease	0·55	0	0	9
Light	0·45			
Various materials	0·62			
Laboratory	0·56			
Selling commission	2·00			
Sundry expenses		0	0	3
Expenses of office, management, etc.		0	2	5
Total		0	6	0

The average weight of coal* required is from 10 to 12 per cent. of the weight of the beetroots, whilst about 4 per cent. of their weight is sufficient in limestone, about 5 per cent. of the weight of the roots of coke being necessary for burning the lime.

With a 13·3 percentage of saccharine, 7·5 tons of beetroots are required for the production of each

* In the case of Garden Cities and very large sugar factories this would in all probability be replaced by cheap gas fuel.

ton. The cost in this case of producing a ton of sugar is :

	£	s.	d.
7·5 tons of roots at 18s.	6	15	0
Expenses of making, at 6s. per ton of roots ...	2	5	0
Total	9	0	0

A sugar factory of moderate size would be capable of dealing with 40,000 tons of roots per annum, and its balance should therefore show :

FACTORY DEALING WITH 40,000 TONS OF BEETROOTS PER ANNUM.

DR.	£.	s.	d.	CR.	£	s.	d.
Cost of beetroots, including expenses, 40,000 tons at 24s. ...	48,000	0	0	5,200 tons sugar produced, at £9 per ton ...	46,800	0	0
5 per cent. depreciation... ...	3,000	0	0	800 tons molasses, at 2s. 4d. per cwt.	1,850	0	0
Profit	3,650	0	0	12,000 tons slices, 30 per cent., at 10s. per ton ...	6,000	0	0
	54,650	0	0		54,650	0	0

The capital expenditure necessary for such a factory to be erected in the very latest style, and equipped in a thoroughly scientific manner with all modern improvements in plant and machinery, would be £60,000. Carried on under proper scientific and technical control, this should yield a profit of £3,650 per annum, and produce a dividend of about 6 per cent.

This is not a very high rate of interest for an industrial undertaking, but in these days, if com-

bined with safety, would be very acceptable. Probably there is no safer industry, for sugar is a *necessity*—a great thing in business. It is, moreover, a commodity of universal consumption.

I am, however, purposely looking at the least favourable side of things all through, and it would be well to consider this point a little more minutely. The result of so doing, it will be seen, is to add to its complexion an even more roseate hue; for we have to consider what will, in all probability, be the effect of this altered state of affairs concerning bounties upon sugar. Through the abrogation of the bounties, it is probable that the figure taken will be not only reached, but that it will be exceeded.

In regard to sugar, overproduction has, of course, been rife for some years; but a continental expert of large experience gives me, as his private opinion, that the ruling prices will be from £9 to £9 10s. a ton for some years, once the present large stocks are cleared from the market, seeing that at that price it would produce a fair profit to the continental manufacturers.

There, however, is yet another important point which I must not omit to bring forward and briefly consider. It is this: that by the Brussels Convention it has been agreed between the Powers concerned, of which Great Britain is one, that all home-grown sugar should be entitled to remission at the rate of 6 francs per 100 kilos—equivalent, that is,

to 2s. 6d. per cwt.—from whatever tax might be levied by the country of its origin. Now, Great Britain, as a signatory of the Convention, must, when occasion arises, accord this remission to her manufacturers. At present a tax of 4s. 2d. per cwt. is levied by us upon *all* sugar. Now, *ceteris paribus*, by the above-mentioned clause the tax on home-grown sugar should be reduced by half a crown —*i.e.*, it should be 4s. 2d. less 2s. 6d., viz., 1s. 8d. per cwt.

Now, this is an important matter, for the remission of 2s. 6d. per cwt. obviously means no less than £2 10s. a ton in favour of the British sugar-maker. The full significance of this may perhaps be more readily seen and better understood if one shows the price which would have to be paid by the consumer for sugar in each case.

	£ s. d.	£ s. d.
For foreign sugar, at £9 per ton ...	9 0 0	
With duty at 4s. 2d. per cwt. ...	4 3 4	
		13 3 4
For British sugar, at £9 per ton ...	9 0 0	
With adjusted duty at 1s. 8d. per cwt.	1 13 4	
		10 13 4
Difference ...		2 10 0

This, being interpreted, means, not only that the British sugar-manufacturer could make his fair profit, but that he could supply the English consumers at no less than £2 10s. per ton cheaper.

Now let us take the case of a still lower figure as the price at which continental sugar could be

supplied—say at £8 per ton. This, with the duty added, would mean the price of £12 3s. 4d. to the consumer. British sugar obviously could be sold at the same figure—£12 3s. 4d. less £1 13s. 4d., or £10 10s. as the price obtained by the producer. To amplify this I have drawn up the following table, by which is seen the price which would be obtainable for British sugar under the circumstances corresponding to different rates of prices of Continental sugar:

Continental.	Duty.	Price paid by Consumer.	British.	Duty.	Price paid by Consumer.
£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
6 10 0	4 3 4	10 13 4	9 0 0	1 13 4	10 13 4
7 0 0	„	11 3 4	9 10 0	„	11 3 4
7 10 0	„	11 13 4	10 0 0	„	11 13 4
8 0 0	„	12 3 4	10 10 0	„	12 3 4
8 10 0	„	12 13 4	11 0 0	„	12 13 4
9 0 0	„	13 3 4	11 10 0	„	13 3 4
9 10 0	„	13 13 4	12 0 0	„	13 13 4
10 0 0	„	14 3 4	12 10 0	„	14 3 4

Now let us again review the position of the prospective British sugar-manufacturer. It has been shown that at £9 per ton he could make 6 per cent.; but with sugar at £10 a ton the proportional increased earnings would raise his profit to 14¾ per cent., with sugar at £11 it would become 23·4 per cent., whilst with £12 sugar it would be increased to no less than 32 per cent. Even under the latter very satisfactory condition of things, resulting in the introduction of an enormous industry into our country,

the consumer would still only have to pay about the same for his sugar as if we continue to remain somnolent, and content ourselves merely with writing cheques for a commodity we could produce ourselves.

From the foregoing facts and figures I trust it may have been shown that we now have it in our power to inaugurate and introduce a vast industry into our country. Its magnitude, however, in its full significance, may not be readily apparent to the non-technical reader. It is brought home to us at once if we consider the enormous annual consumption of sugar in this country alone—to which, of course, should be added that which in all probability we should export to our own colonies.

We consume every year 1,500,000 tons of sugar. To produce this amount would give employment to no less than 300 factories, each capable of turning out 5,000 tons per annum, and affording profitable use of *twenty-four* millions of capital.

To grow the requisite beets, no less than *a million acres* of land might be brought under cultivation for this crop alone. Now, seeing that it requires a man to every 5 acres of beetroot farm, this would give employment to no less than *two hundred thousand* agricultural labourers.

These vast advantages—one must not omit to point out—would be *permanent gains*, despite their vastness; but to them must be added the enormous benefits which would accrue during inception to our building trades and to our engineering concerns.

Turning to the reintroduction of the lost industry of sugar-refining, we find that to deal with the sugar of our own manufacture would require thirty refineries. These would cost another £3,600,000 to build and equip. Hence, the total capital value of the industry to us would be £27,600,000. The manufacture would enable us to pay out in wages at least £5,000,000 a year to operatives immediately concerned. But to this must also be added the wages of the men required to supply the factories with the 2,000,000 tons of coal, 1,500,000 tons of limestone, and 400,000 tons of coke, which would be consumed during the manufacture *every year*. There is, therefore, no reason whatsoever why we should pay away the huge sum of *eighteen million pounds* every year—as we are now paying—to the Continental agriculturists and foreign sugar manufacturers. All of this could be spent in our own country. And what would this mean? It would mean that, by an indirect means, we should be able to resuscitate our once great, but fast-decaying, agriculture; we should be able to pay armies of additional artisans; and we should be able so to increase the wages of our agricultural labourers that they would be able to live in comfort and in comfortable homes, such as it is intended Garden Cities shall set the example in providing.

ANALYSIS OF SOIL TAKEN FROM THE SITE OF THE 'FIRST GARDEN CITY.'

	No. 1. From Field which has been laid down in Pasture for about Fifteen Years (30 Acres).	No. 2. From a Field, 'Little Woolgroves,' from which Oats and Wheat have been cleared.	No. 3. From a Field in another Part from which Wheat has been cleared.
I. Hygroscopical water	2·26	2·56	2·90
II. Full analysis (calculated on water-free substance):			
a. Chemical bound water (H_2O)	2·705	2·903	3·117
b. Humus	0·804	0·640	0·721
c. Nitrogen (N) ...	0·262	0·193	0·181
d. Ammonia (NH_3) ...	0·003	0·001	0·003
e. Nitric acid (N_2O5)	0·006	0·002	0·007
f. Chlorine (Cl) ...	0·004	0·004	0·008
g. Silicic acid (SiO2) ...	9·176	10·134	8·645
h. Phosphoric acid (P2O5)	0·186	0·162	0·177
i. Sulphuric acid (SO3)	0·071	0·081	0·043
j. Iron oxide + oxide of alumina, ($Fe_2O_3 + Al_2O_3$) ...	10·160	9·916	8·117
k. Lime (CaO) ...	0·916	0·810	0·743
l. Magnesia (MgO) ...	0·316	0·612	0·516
m. Potassium (K) ...	0·714	0·416	0·376
n. Sodium (Na) ...	0·461	0·551	0·396
o. Sand	74·216	73·575	76·950
Total	100·000	100·000	100·000

Remarks.—I consider all these three soils as excellent soils for sugar-beet growing.

SIGMUND STEIN,
Sugar Expert.

LIVERPOOL, *November* 25, 1903.

GARDEN CITY DAIRYING.

VERY cursory consideration will serve to show dairy farming around Garden Cities would be attended by many valuable advantages, and to it would be offered facilities that would result in great economic gain. In this case the economic value of the customer being upon the spot cannot be overstated, for it must be remembered that the deliveries of milk are more numerous than any other article of domestic consumption. In addition, I shall hope to show that not only is the cost of carriage a serious factor upon such a heavy entity as milk, but that, moreover, in the making and supply of so intrinsically valuable a commodity as butter, this inevitable item plays an important rôle in regard to the prosperity of the producer.

That the collection of milk from outlying farms and its distribution to consumers by means of horseless vehicles would effect great economy there can be no question. Moreover, the adoption of the latest development in locomotion and transport could be made a great boon to the small dairy farmer by obviating the necessity of his employing

any of his small capital in locomotive plant such as horses and waggons, ponies and carts, and the like. For he would be able to arrange for his milk to be collected and delivered at a determined price and at a known expense to himself. This could be effected either by private contract, or, as I would so strongly urge, by means of a co-operative carriage system, of which he himself could form a profit-sharing part.

The delivery of milk, though more prosaic, is not the lesser important side of the fascinating occupation of which I now speak, butter-making being of greater moment as an industry. In connection with this important branch, we shall again find, as we have mentioned, that the transport problem insinuates itself largely, and should be accorded appropriately serious thought and consideration, for, unlike most industries, facilities of transport in this regard influence *quality* in the manufactured article.

To consider this—and to keep to the axiom I have laid down that before the introduction of anything into a Garden City all that is known of the working of cognate industries elsewhere should be first considered—let us look for a moment to a portion of our own islands where dairy farming has by no means followed the even 'tenor of its way'; where, indeed, it has met with sad vicissitudes—ay, even threatened extinction, followed, happily, by most gratifying recrudescence of success and prosperity through the intelligent leading of applied science to its aid, and this through the laudable

prescience and untiring energy, principally upon the part of one man, and that one the embodiment of patriotism, philanthropy, and personal activity—I refer to Sir Horace Plunkett.

Ireland was once the greatest butter-producing country in the world. Irish butter, indeed, was considered superior to any other, and everywhere it obtained the highest price. This was only a few years ago; yet in a short period it had to give place to butter from Denmark, from Sweden, from France, from Canada, and even from Australia and New Zealand.

What was the reason of this? Irish butter remained as good as ever—if anything the quality became improved, yet the demand for it fell away most sadly, until thoughtful people began to discern that England's butter bill with other nations had risen to the enormous figure of over *thirteen millions* every year, and that she was willing to pay a higher price for foreign butter, because it was to her taste and she could rely upon it. For it is a *sine quâ non* in regard to butter that it must be *uniform* in quality —*i.e.*, it must be of the same colour, the same degree of saltness, and the same flavour.

In this Irish butter, produced so intermittently, in such individually small units, and in so scattered a fashion, failed. Other nations, however, carefully made themselves acquainted with the desires of the British customers, called science to their aid, and their farmers combined together to produce butter

which would please the British housewife—butter at once excellent, uniform, and reliable. Their efforts were crowned with success; their butter was sent to our country, and from small beginnings their exports to us of this commodity rapidly increased,* until our beloved housewife, Dame Britannia, has each year to ask John Bull to send abroad the monstrous cheque to which I have referred.

Let us hasten to see how they managed it, taking as our example the little State—industrious and contented—of Denmark.

The beginning of the present advanced system of butter-making by Danish farmers took place about the year 1870. The sale of Danish butter in foreign countries attracted their attention, and earnest endeavours to improve the commodity, so as to foster its export, took place. The Danes early recognised the value of providing for constant supply with uniformity of quality, and by judicious feeding and the breeding of a sufficient number of autumn calves they ensured for themselves a regular supply of milk. The next step towards their present supremacy in the butter trade was brought about by the introduction of mechanical separators, working on the centrifugal system. As the farms were for the great part occupied as small peasant holdings, it was evident that such farms were individually unable to bear either the capital expenditure or to find sufficient occupation for the necessary

* See rise in imports in appendix to the volume.

machinery. Out of the need thus made apparent arose the co-operative system of dairy-farming.

What the effect has been, of energetically attacking the economic problem presented to the peasants of Denmark by combination and perseverance upon their part, is eloquently testified to by the following tables:

TABLE A.—SHOWING GROWTH OF DANISH BUTTER EXPORTS FROM 1865 TO 1890.

Year.	Weight.
1865–1869 (average)	96,758 cwts.
1870–1874 „	202,741 „
1875–1879 „	258,535 „
1880–1884 „	286,232 „
1885 „	349,250 „
1886 „	396,526 „
1887 „	473,589 „
1888 „	592,455 „
1889 „	676,017 „
1890 „	878,084 „

From this table (A) it will be seen that twenty years sufficed to increase the export of butter from Denmark almost tenfold. From the next table (B) it will be seen that at the expiration of those twenty years the sum earned by the Danish small farmers was a very large one—over *four millions* a year. Another decade, as will be seen, sufficed to bring it up to almost double—viz., the highly gratifying annual payment to them of *seven and a half millions* sterling.

TABLE B.—SHOWING TOTAL EXPORTS OF BUTTER, WITH THEIR VALUE, FOR THE YEARS 1890 TO 1902.

Year.	Cwts.	£.	Average Price per Pound in Pence.
1891	898,068	4,750,611	11·3
1892	891,855	4,825,611	11·5
1893	965,109	5,086,333	10·3
1894	1,160,484	5,609,444	10·3
1895	1,031,171	5,139,666	10·6
1896	998,795	5,140,666	11·0
1897	1,043,486	5,377,388	11·0
1898	1,194,666	6,035,177	10·8
1899	1,204,476	6,611,944	11·7
1900	1,205,804	6,638,888	11·7
1901	1,315,345	7,351,944	11·9
1902	1,372,875	7,506,666	11·7

In examining the Articles of Association of a typical Danish Dairy Society, we find that its object is to erect a dairy with the necessary machinery, to buy the milk from its members, to make the greatest amount of butter possible from that milk, to manufacture as much skim-milk cheese as will supply the requirements of the members, and then also to sell back to them the remaining skim-milk. There are usually five directors, elected by the members, and retiring by rotation, one each year, but they are eligible for re-election—such directors having the right to contract a loan for the purpose of building and equipping the dairy.

A thoroughly qualified and efficient dairyman is engaged, together with the necessary number of

dairymaids and other assistants. Milk is paid for in a most scientific manner—by its 'fat' contents—and is bought by weight. Every member is bound to take back skim-milk and butter-milk, according to the amount of milk he delivers, at the rate of one öre (one-eighth of a penny) per pound, until the debt on the dairy is extinguished; after that the rate is fixed by the general meeting of the members.

All profits go to the extinction of the debt on the dairy. When that is paid off, the chairman, accountant, and dairyman take an inventory of the Society's assets, and apportion the total value in shares among the members, according to the quantity of milk each has delivered since the foundation of the Society. Thereafter annual profits are divided in such wise that each member receives 5 per cent. upon his holding, the balance being divided amongst the members *pro rata* with the value of the milk delivered by each member to the dairy during the preceding year.

The transport difficulties are carefully met. The Society provides the 'churns' in which the milk is delivered, and collects the milk. This is done in the following manner: If a member supplies a minimum of 100 pounds of milk daily, it is collected from his farm; but in cases of farms sending in a less quantity the farmer has to bring his milk to the highroad, and there meet the Society's collecting van. Members are strictly required to keep all cans and transport churns clean, and to despatch

the milk fresh and good. An important provision also is that they are bound to feed their cows after an approved system, in order that they shall give the best possible butter.

The Society, on the other hand, purchase fodder, cake, grasses, and seeds in bulk, and distribute them to the members at a considerable saving in the price over that at which they could procure such individually for themselves. Members' farms are held open to inspection by the directorate and the dairyman, and the greatest care is taken to exclude all chance of contamination by infectious disease. The fines for infringement of the rules are heavy, and are rigidly enforced.

The establishment of these co-operative societies lead to the extinction of the middleman, they becoming soon large and important enough to deal direct with the exporter, who receives the butter, grades it, and delivers it direct both to the wholesale merchant abroad and even to the retail dealer. In 1888 an association of co-operative societies was formed, which exported its own butter direct to an association of English retail dealers, with the object of avoiding the exporters' profit, the result being that fierce competition arose between them and the exporters. By this means prices were forced down, to the detriment of the Danish producers and to the advantage of British consumers.

There are, moreover, schools in which the theory and practice of dairying are taught. Of these,

Denmark possesses three, but their work is supplemented, for it is customary for the larger dairies to take pupils and impart to them a thoroughly practical training. Material help is also afforded to the farmer by the Government, for this appoints experts who may be called in at very low fees to give advice on all points relating to farm or dairy work. To show the solicitous care and nursing accorded to the dairying industry, it may be mentioned that the Government even appointed an expert to reside in England, and to report on all things appertaining to the benefit of the trade, and thus keep producers well versed in the wishes and movements of their customers. The reports received from this industrial consular service are circulated among all the co-operative societies and to the farmers.

Lastly, butter shows are held during eight months of the year, the conditions in regard to these being both novel and practical. All dairies capable of turning out three tubs of butter per week are invited to compete. If they enter, they receive at any unexpected time a letter or telegram to immediately despatch a tub of their butter to the show. This has to be sent off without being manipulated in any way after receipt of the order, and is paid for by the Government at its market value. On arrival, it is carefully weighed, and then sealed into a tin case and put on exhibition for fourteen days. A full return of the feeding and general system followed on the farms during the

week in which the butter was made has to be sent with it. The judges are nine in number—butter merchants assisted by three dairy experts. These are divided into three groups, and each group records an independent judgment. The butter thus sent off, which must, perforce, be a fair sample of every-day produce, is examined on the day of its receipt and at the end of the fourteen days, and the final report upon it is prepared from a comparison of the three reports of the judges. It is usual to have butter from the same dairy several times during the exhibition. In this way valuable information is gained, not only concerning the best dairies, but also of the success or otherwise of the various methods of feeding and general system employed.

The Government, moreover, in order to prevent any chance of adulteration, has drawn up and enforces the strictest regulations as to the importation, manufacture, and sale of margarine, and other butter adulterants and pseudo-substitutes and imitations.

As a further example of the wise care and fostering accorded to a valuable industry, it may be added that in 1891 the Danish Government commenced a systematic attempt to eradicate tuberculosis from their cattle. Their chief veterinary surgeon, Dr. Bang—whose reputation stands high in all European countries—it should be mentioned, has a confirmed faith in the use of tuberculin inoculation. The Government supplies this tuberculin gratuitously to the farmers, and in addition pays the expenses of

the veterinary surgeons engaged in making experimental inoculations. In return the farmers are compelled to observe certain conditions. For example, all those animals in which reaction has taken place as a result of the inoculation are separated from those in which it has not. Those demonstrating the disease to be at all advanced are either slaughtered at once or after having been rapidly fattened. All cattle-sheds are thoroughly ventilated, and the rays of the sun freely admitted. Cattle not reacting upon the first test, and therefore apparently still healthy, are tested twice annually. Calves are brought up on the milk of those cows which are healthy, or which, having reacted, are but slightly diseased. In this way it has been found that the calves born of diseased cows have been invariably reared in a perfectly healthy condition. The work has been in every way successful, and the Danish dairy-farmer is in a good way to have that scourge of Europe—tuberculosis—entirely eradicated from his stalls.

It has been computed that the introduction of this system into Great Britain would involve an expenditure of some £200,000 per annum for the first year or two, with subsequent decrease in cost as the disease became eradicated. This expenditure at first sight is rather alarming, but yet it should be productive of economy, for an expert has estimated the loss from this disease to Scottish cattle-dealers alone at £440,000 per annum. This being so, it

would appear that such a course would, in reality, constitute a good and prudent investment. In spite of these facts, however, we—Great Britain—remain almost the only country in Europe that has not attempted something in this direction.

These being the facts—vastly derogatory to the credit of our own country, yet only to be expected, having regard to the unfortunate rate of importance at which technical education was assessed by public opinion—did not escape the notice of the patriotic worker of whom I have mentioned, and who, with energy and endurance of rebuff unstemmable, at length succeeded in bringing about the establishment of a Department of Agriculture and Technical Instruction for Ireland, now happily presided over by himself.

Before consummating this, however, recourse had to be had to that most potent mode of persuasion and conviction—the object-lesson. This was brought about by the earnest co-operation of other patriots under the name of the Irish Agricultural Organization Society, and it is to the valuable work carried out by them in co-operative dairy-farming I wish to direct the attention of Garden City authorities; for the success attained should serve not only to give confidence, but point to assured success, and this upon lines highly beneficial to those of the community not possessed of capital, or possessing capital to a but very limited extent.

The Irish creameries are essentially co-operative.

The shareholders are the farmers themselves, and everyone is eligible who owns a cow; thus the profits and advantages are shared in alike by the owner of a single cow as by the owner of five hundred. The shares are paid up in four instalments of five shillings each, and interest is paid upon such shares at the rate of 5 per cent. per annum. The first instalment is paid in cash, and usually the second, but it is permissible to pay the third and final instalments in milk. There would appear, however—in the case of a Garden City installation—to be no objection to shareholders other than those owning cows to assist and participate, provided their shares were cumulative, and limited to a dividend of 5 per cent.

Thus the creamery is owned and managed entirely by those who have taken shares. They are called the members, and elect a committee to manage the business, every member having a vote in the election of the committee—the man or woman with *one* share having the same voting power as the man or woman with a hundred. This committee appoints the manager, the dairymaid, and all the other hands. In this regard I might mention that one of the difficulties met with has been in the finding of properly trained and qualified managers and dairymaids, so quickly has the movement grown, and I would therefore recommend that in Garden City Technical College such training should be undertaken in co-operation with the dairy-farmers and

the creamery, work upon the farms and in the creamery forming part of the curriculum.

The committee meets every month or oftener to examine the accounts, to fix the prices of milk, and to transact the general business of the society. In this regard it would be highly advisable that both technical details and records, as well as monetary accounts, should be kept with scrupulous exactitude, in order that they might be available as reliable *data* and statistics. It would certainly not be prudent to emulate the example of one Hibernian manager, who, when called upon for his books of account, showed them to be of virgin whiteness, remarking, however, that they were perfectly correct, as could be proved by the vouchers, and then proceeded with laborious deliberation to disinter from the recesses of numerous pockets the soiled, frayed, and almost illegible records of the society's business transactions. The farmers send in their milk, in the summer night and morning, in the spring and autumn once a day, and in the winter every alternate day. It is quickly run through the 'separators,' which take out all the cream, and the separated milk, or skim-milk, is, after being *pasteurized*, returned *free* to the suppliers. When the milk comes in it is measured, then a sample is taken to be tested. All milk is not equally productive, so it would be unfair to pay the same price for poor as for rich milk. There are testing machines now used in all the co-operative creameries, which show

exactly how much butter each supplier's milk will yield, and he is paid accordingly. This gives fair play all round, and the man who neglects his cows, or starves them, or who keeps them till they are too old, or puts water in his milk, or skims some of the cream off, is punished by getting a low price, while the man who is honest, and who treats his cows well, gets the full reward of his honesty and thrift.

Every milk supplier not only gets back his skim-milk (or separated milk, as it is called) free, but also his share of butter-milk. For instance, a man supplying 10 gallons of new milk gets back, say, 8 gallons of separated milk and about ½ gallon of butter-milk; these proportions will, however, vary slightly according to the time of year. The separated milk is sweet and wholesome, and calves thrive well on it if they get enough and get it fresh; but it contains no cream, and therefore it will well repay a farmer to give his calves some artificial food as a substitute (which can be bought wholesale at a moderate price by the creamery).*

For a considerable time Irish farmers only realized an average price of less than 9d. per pound for their home-made butter. Even at this low selling price let us see what was the value of applied science to them. It takes on an average 3 gallons of milk to make a pound of butter under the old plan of butter-

* Reference to the feeding of cattle with by-products of beet-root crops will be found under sugar manufacture.

making, so that their milk returned less than 3d. per gallon. The average price paid for milk by the mechanical creameries at the time referred to was between 3¾d. and 4d. per gallon—the average price of many has been much higher. This, at the lowest computation, shows a gain of ¾d. to 1d. for every gallon of milk. An ordinary Irish cow will yield 500 gallons of milk in the season, and at 3⅞d. per gallon such a cow will thus return £8 1s. 6d. a year if her milk be sent to the steam creamery, instead of only £6 5s. 0d. if it be skimmed and churned at the homesteads. Thus the farmers gained £1 16s. 6d. per annum per cow, in addition to their dividends upon their shares in the creamery.

Out of this extra profit of £1 16s. 6d. per annum per cow, the farmer might well invest £1 for each cow every year, and thus rapidly become a considerable shareholder in the society. For, as has been mentioned, to make it easy for everyone to join, the greater part of the share may be paid in milk instead of money. This may be conveniently done by the shareholder consenting to a reduction in the price of his milk until he has fully paid up his shares; the payment comes easy to him in this way, for he receives, all the time, nearly as much as if he made his butter at home, yet he will be paying up his shares at the same time.

The sense of proprietorship is also gratifying, for he can walk into the concern of which he is partner

and inspect the accounts at all reasonable times. He can see his milk measured and tested, and he can lodge any complaint he may have with a committee, consisting of his friends and neighbours, and elected by himself and brother-farmers.

The net profits of the society, when ascertained by the auditor, are thus dealt with: Five per cent. is first paid to all members on the amount paid up on their shares; not less than 10 per cent. of what remains is divided in shares among the workers in the creamery in proportion to the wages earned by each, and the remainder is allotted to the milk-supplying members in proportion to the value of the milk supplied by each.

These co-operative creameries also undertake valuable work, beyond that of butter-making, such as arranging the markets for the produce of the farmer, obtaining for him manures and implements almost at wholesale prices, as well as coal, seeds, feeding-stuffs, and the like.

In connection with all this, and especially reduction in expense in transit, Garden Cities could offer great advantages. It will be well to consider the latter point a little more fully. As in almost every industry, the larger the creamery the more efficient it becomes in its working, and hence the more economically can it carry on its business. But obviously the larger the central factory, the greater must be the area overspread by its operations; but increased area means increase in transit of the

entities involved, and hence a limit is reached beyond which the operations of the central factory cannot economically extend. Reflection will show that the extent of area to be worked is entirely dependent on two factors—(*a*) the cost of transport, and (*b*) the time occupied in such transport.

With horse haulage the limit is soon reached; due to inefficiency under both heads—viz., cost and time. It is very obvious, on the other hand, that horseless transport would stand at far better advantage, and thus beneficially influence both the scale of operations and the economics of production. The transport difficulty has given rise to the establishment of what are known as auxiliary creameries, but which, in fact, are 'separating' stations, for the operations therein carried on are restricted to the mechanical separation—by means of centrifugal separating machines—of the cream from the milk; nevertheless, such separating stations have to be equipped with machinery and motive power, as well as with the working staff, so that obviously their number should be kept as small as possible in a given area.

It is equally obvious that the adoption of motor transport at once solves the difficulty, and points to the advisability of establishing in Garden Cities a large creamery and butter-making factory, not only equipped with the greatest care and forethought in regard to its dimensions and plant for a given and immediate output, but also having regard to exten-

sion. The civic cheap supplies of good water, lighting and electric power, economical heat for scalding, cleansing, pasteurizing, and suchlike, would be available to mutual advantage, whilst motor vehicles would be called upon for the performance of three specific duties—(*a*) the collection of new milk from the farms and its transport to the auxiliary (separating) stations; (*b*) the carrying of the cream from these to the central factory; and (*c*) a service, by specially constructed refrigerating waggons, of dairy produce between Garden City and London. It may be interesting to add that dairy societies, worked in the manner I have described, are making rapid strides in our Sister Isle; their number has continuously and rapidly increased from the inception of the first, quite recently, to no less than (central and auxiliary) some 350 at this moment. The number of members in 1902 was over *forty thousand* (41,299), and the trade turnover exceeded a million pounds (£1,039,615). This year it is greater.

The present tendency—doubtless for the reasons I have set out—is to centralize the manufacture of butter as far as possible by the reduction of the number of churning factories (which for convenience are described as 'centres'), and to increase the number of 'auxiliaries'—viz., the stations for the separation of the cream from the milk. Latterly, nearly all the auxiliaries have been registered as separate societies, as it was found desirable to give

them a separate corporate existence, in order that they may be free to carry on any kind of business required by their members, and merely federate with a centre for the purpose of manufacture. Separate registration, moreover, possesses the further advantage of enabling the auxiliary to make arrangements on its own account for accommodation from its bankers. The only difficulty which had to be overcome was to devise an agreement under which the respective rights of both the centre and the auxiliary should be clearly defined, and yet which should vest in a joint committee, appointed by the centre and the auxiliaries, the power of supervising and directing all branches of the business relating to the manufacture and sale of the butter.

Obviously, the simplest and most equitable method of dealing with the question would be for the centre to pay each auxiliary for the exact quantity of butter-fat supplied in its cream, less an agreed rate per hundredweight for working expenses; but this has hitherto been found impracticable owing to the great difficulty of testing thick cream accurately. It is hoped, however, that this difficulty may be shortly overcome, and to this end experiments are being carried out in several creameries, and the Department has been asked to institute experimental inquiry into the matter. If the experiments prove successful, the relations between auxiliaries and centres will be rendered as simple and satisfactory as those of individual milk-supplies to their

creamery. At present it is found necessary to churn the cream from each auxiliary separately ; this, besides entailing the provision of several churns and much extra work, renders it very difficult to produce butter of uniform quality and character. If the possibility of testing the percentage of fat in cream can be clearly demonstrated, a centre will at once be enabled to churn the cream of as many auxiliaries simultaneously as the capacity of the largest factory churn will admit of.

Having touched elsewhere (see Chapter VII.) upon the cost of carriage, I will not pursue it here, except to add that it is a matter of much importance, and one which can be dealt with very effectively under schemes of co-operative dairying.

A method of carrying on an important apiculture industry I most strongly recommend should be followed in connection with Garden Cities could very conveniently be worked in with the co-operative dairy of the City. This, in regard not only to the disposal of the honey, but also by the co-operative mechanical process, I advocate being carried out in the dairy by means of its machinery. There is no industry in connection with which hygienic conditions should be more rigorously insisted upon than dairies. The Health Committee of Garden City will doubtless have much to say in this regard, and I will therefore content myself with mentioning but one point—namely, the process of pasteurizing or sterilizing. Seeing how prone milk is to act as

vehicle in the spread of epidemic disease, pasteurization is demanded upon scientific grounds. Apart from this, it introduces a far more perfect system of milk delivery. The practice of placing jugs outside doors, where they collect germ-laden dust, and are subsequently filled with milk for human consumption, cannot be too strongly condemned. In the process of sterilizing, hermetically-sealed white glass bottles are made use of, and these, with the non-polluted sealed milk, are delivered in a much more inviting, as well as perfectly hygienic, manner to every house, where, moreover, it will not deteriorate in any reasonable time.

This process, I contend, should be introduced in a Garden City from its inception, for not only does it fulfil sanitary requirements, but it represents an increased source of profit for the dairy. Sterilization consists merely of heating up the milk within the bottles in a certain manner and closing them before cooling, by which means a partial vacuum is produced. The apparatus is quite simple and the cost of the process nominal, yet the milk sells at the increased price of 5d. a quart. From the point of view of health, also, pasteurizing is of importance in the economics of production. Obviously it is a measure of safety in connection with the rearing of the calves, and for this reason milk so treated is regarded with high favour by intelligent breeders, and, moreover, the process, it is gratifying to note, is being rapidly extended.

Cognate with the process is that of 'humanizing,' a matter of great moment in regard to the raising of infants, which, as bearing upon the resuscitation of the vigour and physique of the population, should be provided for in Garden Cities.

Speaking of price, Garden Cities would also stand to considerable advantage in regard to dairying if my suggestion of a London 'Depot,' or 'Garden City Market,' be carried out; for milk contracts are made at the end of March—from the farmer's point of view, a bad arrangement. At that season of the year milk is plentiful, and, for fear of having large quantities left upon their hands, farmers often have to make contracts at a price which does not even pay expenses when, later on in the season, milk becomes scarce.

This, with Garden City Dairies, could be got over in two ways: firstly, by the 'market,' or 'depot,' supplying directly to the consumer; and, secondly, by the milk being utilized in the dairy, say from the middle of April to the end of June, in cheese-making.

I will not, of course, touch upon practical details, which can be dealt with much more ably by others, but I would point out that farmers have much to learn from foreign nations in regard to throwing off antiquated methods, and in the substitution of scientific for haphazard and *laissez-faire* modes of conducting their business. The farmer is seldom a good business man, and still more seldom a

systematic one as to details, such as scientific methods demand.

I will touch upon but one point in exemplification and in order to draw analogy—namely, methods of ascertaining the profit-returning value of individual cows. With us this palpable necessity in the economics of dairying is practically neglected; elsewhere it has been reduced to a science.

Writing upon this point, Miss Bradley, Warden of the Lady Warwick Agricultural Hostel, says: 'In view of the milk standard, and the attention which public bodies are bestowing upon the question of our milk-supply, it behoves all farmers to awake to the fact that, if they wish to place upon the market a milk such as is now required, very different methods of production and treatment will have to be adopted. First and foremost, it will be necessary for them to know the quality and quantity of milk given by each cow. This may be satisfactorily and easily arrived at by the use of one of the various milk-testers now to be had.' The milk from each cow should be weighed daily; in some places it is done weekly, but this is not nearly so advantageous, and is very apt to be forgotten altogether. The weighing-machine should stand in the shed, and, after weighing the milk, the amount should be at once entered on a sheet bearing *the name of each cow*. If this were done, farmers would find in many cases that they were housing and keeping animals not worth their keep.

Apart from individual gain, this weeding out of all cows giving milk poor in quality or quantity would in time considerably improve the milking herds of the country. Thus, individual gain would become merged into national benefit. In this relation the value to this country of the work of 'gentlemen farmers' and the interest taken in agriculture by the King and the more wealthy has borne good fruit, because it has resulted in the formation of the Royal Agricultural Society and numerous others, the outcome of the encouragement thus given and the rewards given for meritorious effort being that our breed of cattle stands unrivalled.

A well-bred, profitable cow costs no more to keep in labour and food than a poor one; therefore why not go to the trouble of finding out which are the poor ones, and getting rid of them at the earliest opportunity? Just as milk is prepared for cheese-making, and cream for butter-making, so milk should be prepared for sale.

Let me now turn to Canada, and quote from the Report of the Ottawa Farm:

> The improvement in the whole herd demands the study of the unit—that is, a close acquaintance with the expenditure on every individual cow and the returns from the same. This can be determined in no other way than by keeping a record of the daily milk yield and the daily food consumption. Forms similar to the following for keeping a record of the milk yield are supplied free on application, as indicated on the form:

Daily Milk Record.

Herd belonging to .....

Post-Office .....

Record for week ending .....

(This form supplied free by Live Stock Division Central Experimental Farm, Ottawa, Ont.)

Cows.*

Day.	Time.	Ada.	Bell.	Cissie.	Dora	Eva.	Flora.	Gertie.	Helen.	Inez.	Jessie.	Total for Day.
Sunday -	M.											
	A.											
Monday -	M.											
	A.											
Tuesday -	M.											
	A.											
Wednesday	M.											
	A.											
Thursday -	M.											
	A.											
Friday -	M.											
	A.											
Saturday -	M.											
	A.											
Total	Week -											

Remarks .....

Milk Records.

1. The profitable dairy cow must give over 5,000 lb. of milk each year. To know the value of a cow, her total annual yield of milk must be known. The only way to know this is to keep a record of her daily milk yield.

2. The form on the other side of this sheet is intended to help progressive dairy-farmers by supplying them with a simple and convenient sheet for the keeping of the milk records of their

* In large farms the cows are most conveniently designated by numbers, which may be branded on the hoof; in smaller ones names may be used.

individual cows. A study of such records will soon indicate which cows should go to the butcher. We would be pleased to receive a summary of your record: If you have no summary forms, write us.

3. Such records are being kept by hundreds of successful dairymen to-day. Many of these men attribute their success to the keeping of such records. Why not give the thing a trial if you are a dairyman? It will increase your milk product; it will lighten your labour, since your interest will be increased in your work, and interest lightens labour. It will show you the unprofitable cow the 'boarder.' You cannot get rid of her too quickly.

4. For weighing the milk, a simple legal spring balance may be secured for from one to three dollars. If your local dealer cannot supply you, write the undersigned for particulars. A small platform scale is fairly convenient, but we find the spring balance preferable.

5. Many farmers keep records of the amount of feed fed to individual cows. If you would like to do so, sample forms would be sent free on writing to J. H. Grisdale, Agriculturist, Central Experimental Farm, Ottawa, Ont.

This extract will serve to convey some idea of the infinitely greater solicitude for taking advantage of all modes, methods, and procedures available, with the view of increase of efficiency combined with reduction in working expenses, to be found in Canada and the United States of America, of which I give other samples in dealing with agriculture (see Chapter VIII.).

In the foregoing remarks concerning butter I have shown how very easy it is in commerce to lose a good name, and the corollary of loss of name is loss of trade. But consumption is necessarily always on the increase, so that loss of our trade is

synonymous with gain to the foreigner. How quickly the foreigner takes advantage of his opportunity is also well illustrated in the rapid extension of the Danish butter industry, and the succeeding rapid rate of rise of their exports.

If we turn to cheese-making—also a very suitable occupation for Garden Cities—we again find that, despite increased consumption, our farmers have allowed the trade sadly to dwindle. This will be seen by reference to the following table showing the state of the cheese trade for the ten years prior to 1901:

	Home Produce. Tons.	Imported. Colonial. Tons.	Imported. Foreign. Tons.	Total.
1891 - -	147,078	43,228	60,816	251,122
1892 - -	148,642	45,781	59,452	253,857
1893 - -	140,394	55,459	56,767	252,710
1894 - -	131,843	57,322	52,498	241,663
1895 - -	150,611	61,622	52,570	264,803
1896 - -	137,148	62,478	44,569	244,195
1897 - -	130,000	67,028	46,317	243,345
1898 - -	148,260	77,620	49,114	274,994
1899 - -	150,000	73,752	46,985	270,737
1900 - -	130,000	74,702	53,903	258,605
Ten years' average	141,396	61,908	52,299	255,603

A relieving and pleasing feature, evidenced by a consideration of the figures, is that the falling off on the part of the British farmer has been made up by our colonies, who, it will be observed, have outdistanced the foreign exporters. The factor I have referred to—good name—largely explains this. For under the head of 'foreign' is, of course, included

America. Now, the Americans, in their haste to capture the trade, called science to their aid unscrupulously, carrying adulteration to a fine art—or, as someone once put it, 'Cousin Jonathan was studying with too much enthusiasm how to make cheese from grease-rags.' In this relation it is somewhat unfortunate that under the generic title of 'American cheese' is also included our Canadian produce.

This leads me to make the suggestion that in a Garden City not only the application of science, but the application of integrity and honesty, should be conspicuous in its trading, and that whatever commodity—be it butter, cheese, silks, shirts, machinery, or motor-cars—may bear the label of 'GARDEN CITY,' that commodity, by reason of its carrying such label, shall truthfully proclaim itself *honest* and the *best* that can be produced. I would go farther and suggest that, in the granting of leases to shopkeepers, etc., there should be a clause empowering the City—*the lessor*—to determine such lease without compensation in the event of conviction for adulteration.

British farmers, happily, have not let their *quality**

* This remark applies specially to large producers; the proportionate cost of production in the making of cheese in small quantities is *higher*, and the quality of the product *lower*, so that in numerous instances farmers have abandoned cheese-making. This confirms what I have ventured to suggest in regard to the establishment of a large and scientifically equipped dairy, in which

fall with their quantity, and they therefore justly command higher prices. Home-made 'Cheddar,' for example, fetches on the average from 70s. to 80s. per hundredweight, as against 54s. to 56s. per hundredweight for Canadian cheese made upon the Cheddar principle. A reason for the difference is that the latter cheese is of indifferent flavour, due to quicker 'ripening' in order to get it earlier upon the market, with the result that it will not keep so long as 'home-made.'* Both in regard to American and Canadian cheese-making everything is done by machinery, with the exception of milking the cows. This being a matter in which the good ladies' tempers and dispositions come into play, and not, therefore, a purely mechanical problem, has not hitherto been very successfully dealt with.

The matter is one of great importance, however—more so, perhaps, in our country than elsewhere—for not only are agricultural wages higher, but efficient milkers, absolute essentials upon a successful dairy-farm, are often very difficult to obtain.

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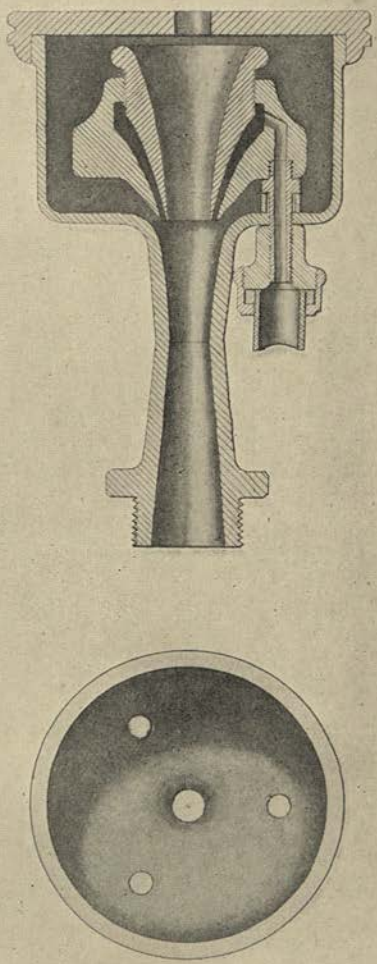
both cost of production and quality of product would come out very satisfactorily.

* Apart from this, it should be very difficult for a retailer to deceive the public, because the imported manufacture, in addition to its greater acidity, has the marks of the cotton binding showing around it. Our cheeses are wrapped, but with the 'American' the wrapping is left on, and though it may be removed afterwards, the texture of the material is so impressed upon the rind that it takes a good deal of pains and labour to remove the tell-tale signs.



Pneumatic Milking Aspirator (Sennett).

Indeed, in some districts where scarcity of agricultural labour in general and milkers in particular is acute, farmers have been compelled either to reduce their dairy herds or to abandon the dairying branch and substitute for it sheep-farming. Some years ago I constructed a 'milker' worked by compressed air, which, by a system of aspiration,* produced the requisite 'sucking' action. It performed its work in a satisfactory fashion, but I met with no great enthusiasm for its adoption. Recently, however, mechanical milking has been resorted to, and successfully carried out by direct pulsating suction. The vacuum may be obtained by an ordinary air-pump driven by a steam- or gas-engine or an electro-motor. Connected with the partially evacuated tank are pipes passing along the cowsheds at a convenient height above the heads of the cows. From these short branches descend between each alternate beast, and are each furnished with a vacuum cock. To carry out the operation of milking, an indiarubber tube is put upon one of these branch pipes and carried to the pulsator affixed to a cone-shaped pail standing between a pair of cows and near the manger. From the pulsator two other tubes branch right and left, one to each cow, and each tube is attached to four rubber teat-cups which are slipped upon the teats of the cow. When the cock upon the vacuum-pipe is opened, the

* See illustration.

pulsator commences to work, and causes the cups to collapse and expand, and thus suck the milk from all four teats at once, an almost exact imitation of the calf sucking its mother. One machine with a man and boy is said to do the work of six men skilled in milking, and with less labour to themselves. This system, the Lawrence Kennedy, is working on several farms, and is testified to be giving great satisfaction. At one farm a herd of upwards of forty cows is regularly milked by its means.

In connection with large herds, it is obvious considerable economy could be effected by the introduction of mechanical milking; but apart from this, benefit would be derived in regard to quality, for it must be remembered that milking should be done quickly, and the quicker the milking the richer the milk.

It should be mentioned that New Zealand is also sending us increased quantities of cheese, and its quality is improving. It appears to pay our colonies better to send us cheese than butter; therefore any increase of output of home-made butter will not hinder colonial trade, but will only reduce the quantity sent to us from the Continent.

Without doubt, one of the reasons to be ascribed for the falling off of home-made cheese is the fact that farmers can do equally well, or better, by selling their milk *quâ* milk.* Here, again, the small producer is at a disadvantage, on the point of cost of

* A letter just to hand from Lord Rayleigh, F.R.S., a very large purveyor of milk, corroborates this.

carriage to large towns, and in this connection. it may be interesting to mention that science appears to have recently pointed to a somewhat queer and circuitous means of cutting down the cost of transport of milk by first converting it into a powder, which can, at will, be reconverted into milk by the mere application of hot water.

The process consists in passing the milk over heated rollers, by which means the whole of the water contained in it is instantly evaporated. There remains a solid, which is cut into pieces by knives, and finally ground down to a fine powder. Should the process come into extended operation, dwellers in our large towns will receive their morning's milk by the morning's post, the 'postman's knock' taking the place of the dairyman's 'Milk-oh!' The system, without doubt, possesses great hygienic potentialities, for obviously the present great danger from contamination would be entirely removed, whilst the process of solidification is obviously one of sterilization or *pasteur*ization. Assuredly, 'powdered' milk would be a great boon to travellers. Here is a novel process possessing much merit, which might with advantage be added to a Garden City Dairy so soon as its success shall have been fully demonstrated. Great Britain has a great future for dairy-farming, for our pastures are unrivalled, and the quality of the milk depends upon what the cow eats; therefore in this respect we need never be beaten.

From the trend of all improvement towards the mechanical, and the reference I have ventured to make concerning mechanical milking, the visitor to Garden City will have little hope of airing his gallantry, with 'Where are you going to, my pretty maid?' and receiving from rosebud lips of robust health the nursery-book reply. But this should not 'fash' us, as James Watt would have said, for the milkmaid's life, though picturesque, is at the same time arduous. Moreover, there is much in and about the cleanly dairy we may look to being performed by women. Cheese-making is by no means light work, especially if we are to continue to make the immense cheeses it has been our wont to do. If dairy work is to consist of the manufacture and subsequent daily 'turning' of 60, 80, and 120 pound Cheddars, it should certainly be classed as *heavy* work—work more suited to males.

But, let us ask, is there not another side of dairying in which we could take lessons from abroad, to the end of creating employment at once light, fascinating, and dainty, and even more interesting than butter-making—employment calling for far more of skill and head-work than of manual toil? Surely we have it in the dainty and toothsome 'soft' cheeses, all of which—with perhaps the exception of St. Ivel—are at present obtained from abroad. It comes as a surprise that our country should show innovation in dairying, for it is such an old industry, and a

maxim of our countryfolk appears to be, 'What *was* right *is* right.' This cheese owes its characteristic chiefly to the enrichment of the milk by means of added cream. English farmers appear never to have studied the art of soft cheese-making, though it would pay them better than selling milk at 6d. a gallon, out of which they often have to pay ¾d. or 1d. per gallon for carriage.

In this relation women might well step in; indeed, this branch of pastoral industry would seem to await development at their hands. Concerning soft cheese-making, the Mistresses Bradley and La Mothe tell us that such dairying can be entered upon without any expensive plant. 'All that is required,' they say, 'is an ordinary-sized dairy and a room for ripening the cheeses in, in both of which there must be a means of regulating the temperature, either by stoves or pipes. If possible, a cellar which can be well ventilated is the best place to ripen these cheeses in. Where the dairy is already in existence, a sum of £5 would buy everything required to start in a small way, making three or four different kinds of cheese. There are many varieties of soft cheese, of which the best known are *Camembert, Coulommier, Pont l'Evêque, Gervais, Bondon*, and, of course, the ordinary English cream cheese, which practically anyone can make almost anywhere, and which sells for nearly double the value of the cream used. Camembert is a variety very largely made and appreciated abroad. It has been

made in England on a small scale for some time, but, unfortunately, no one as yet has succeeded in obtaining the characteristic flavour* and consistency of those made at their own home in Normandy. Apart from Camembert, however, there are many of the other varieties which can be made as well here as in Normandy, Brittany, or Switzerland. Pont l'Evêque, for instance, always sells well, having a very delicious flavour. It takes about six weeks from the time of making till it is ready for market. Gervais and Bondon rather resemble each other; they are smaller than Pont l'Evêque, and do not take such a long time to ripen. Gervais is fit for sale at the end of three days. Coulommier is also a very favourite cheese, besides being easy to make and profitable to sell.'

From the foregoing remarks it is abundantly clear that not only is there scope for great improvement in husbandry, but also a large field for female work in connection with dairying. I have mentioned that in Danish dairies pupils are taken, whilst with us there are all too few agricultural colleges at which courses of agricultural instruction can be gone through at a moderate expense. It would therefore appear that Garden Cities might do much to rectify this,

* This is probably due to some herb or variety of grass found growing in the Camembert district, for it has been found that the Gruyère cheese owes its peculiar flavour to the Alpine *alchemilla*, which is now, on that account, often purposely sown elsewhere.—(See 'Fragments of Continental Journeyings.')

and to ameliorate conditions of industrio-agricultural occupation, in which we are, unfortunately, far behind other countries. To bring this about I would suggest two things—(*a*) That thoroughly practical courses of instruction should be given at Garden City colleges, and (*b*) that the authorities should give every facility for the instatement, upon the agricultural girdle, of young women who have passed satisfactorily their courses of agricultural instruction at other colleges, as, for example, the Lady Warwick Hostel, to which I have referred. This, it is obvious, could be done with safety and nominal expenditure in connection with the industry of soft cheese-making.

These young people would bring to Garden City their *quota* of capital carefully wrapped up in the well-stocked convolutiæ of their brains, this representing, let us hope, the mental equivalent and money value of the sum they had previously paid for their training. I feel the remarks I have ventured to make anent co-operation in dairying will serve to indicate a facile mode of providing them with the necessary monetary capital. For if, on the strength of the integrity of non-educated, behind-the-times, Irish peasant farmers, the requisite sums—and considerable sums—have in *hundreds of instances* been forthcoming, and proved beneficial and safe investments, how much more readily should the *small* sums requisite for this scheme—for I am only suggesting the installation of hand dairies, to be supervised by these post-students and worked by

current ones of the civic college—how much more readily should the requisite small sums be forthcoming.

To carry the idea into effect it would only be necessary to form a few co-operative soft cheese-making societies, the members consisting merely of the post-students themselves, and those—as, for example, persons having other interests in the City—who had found the requisite small capital for the hand-dairy building and its appurtenances.*

In regard to the suggestion I put forward, it is interesting to have the opinion of the Warden of the Agricultural College, Studley, where, under the auspices of the Countess of Warwick, women alone are trained: 'Your suggestion that Garden City authorities should start some of our ladies in the

* Butter, as most people are aware, is simply made from cream churned into a solid mass of fat particles after a certain ripening process has been gone through. With cheese, the manufacture begins with the whole milk before any separation has taken place. The liquid as it comes from the cow is heated to a temperature varying according to the system of production, but generally about 90° F. Rennet is added for the purpose of hastening the coagulation of the heavy particles. This results in the presence of two substances, best known as curds and whey. Together these are put into a large tank and subjected to a rather high temperature, after which the whey is drawn off. What remains is worked together, pressed for the removal of any lingering quantities of whey, and moulded into the form in which it is generally seen, though before being put on the market it has to mature. This, of course, is merely a very rough outline of what is done, but it conveys the general idea.

world by providing a small dairy for the making of soft cheeses I think is exceedingly valuable.' Miss Bradley pleads that it might be extended to large dairies, and explains that the work of the students —albeit 'these belong to the educated classes'— is performed in no *dilettante* manner, but that 'thorough practical hard work' forms a conspicuous part of the curriculum, concluding with the expression of opinion: 'The underlying principle of your idea is a grand one, and I should be only too glad and pleased to see it taken up.' The object I have in limiting my suggestion to 'hand,' and therefore small, dairies is that, if a large one be arranged for, upon the lines of the Danish and Irish Co-operative Dairies—proved successes—not the slightest difficulty would be experienced in regard to the capital required, whilst the same may be said in regard to these post-student concerns, because of their smallness. That they would grow is to be both hoped and expected.

Cheese-making is so intimately connected with dairying that I need not dwell further upon it, except to express my conviction that the establishment of an extensive and well-equipped creamery, buttery, and cheesery, the whole worked upon the most scientific and hygienic principles—which latter would be an important safeguard in regard to the health of the community—would prove a very remunerative investment. It is an interesting matter and one which, it is seen, could be entrusted

to women to their material benefit. 'There are many reasons to induce women to take up market-gardening and other light branches of agriculture,' says the Warden of Studley College. 'First, because if they are fitted for it the life is a most healthy one, and improves their physical condition enormously. Second, it can be made a means of livelihood. Third, they would help the country and add to the revenue, by producing for home consumption those things which are now looked upon almost as necessaries of life, such as eggs, poultry, butter, cream, cheese, fresh fruit, vegetables, jam, bottle fruits, etc., etc. Further, the advent of cultivated enterprising women into country districts should be a fresh factor in helping rural and village industries and generally in bringing life and interest back to the country, which, perhaps, again may help in some measure to stay the depopulation.'

In this instance again, it will be noted, such work would do much in the way of an object-lesson in the interweaving of agriculture with industry, which, I suggest, is one of the most important factors in the problem of 'the return to the land.'

APPENDIX TO CHAPTER VI.

SYNOPSIS OF THE HISTORY OF SERICULTURE.

'Silk does not immediately come hither from the worm that spins and makes it, but passes many a climate, travels many a desert, employs many a hand, loads many a camel, and freights many a ship, before it arrives here; and when at last it comes, it is in return for other manufactures or in exchange for our money.' (*From an old writer. It remains, unfortunately, true with us to-day.*)

CONSIDERING, as I do, that the outcome of the small experiment I propose in silk culture might with reasonable good fortune gradually develop into an industry of national importance, I think it may not be without some little value if I append to this chapter a short synopsis of the history of sericulture, for from this it will be seen that in any country where the climate is at all suited this interesting and pastoral occupation, so well suited to women and children, and, as I suggest, for many of those of indifferent health, or in other ways incapacitated from more robust labour, can always be carried on successfully. I am also anxious it should be noted the venerable calling has in no case been established in a modern country without strenuous effort and the seizure of the golden opportunity.

I only ask that the golden opportunity now arising in connection with 'Garden Cities' should receive genuine and sympathetic consideration.

Sericulture is a very ancient occupation, and like all ancient occupations which have not lent themselves to the introduction of machinery, it has become confined, principally, to lesser prosperous countries by reason of the small wage-earning

capacity of the operatives, and for this reason I have suggested it for the benefit of that class whose wage-earning abilities must always be handicapped. The fact, however, must not be lost sight of that the occupation is one well suited to be carried on in conjunction with others; in this respect it closely resembles hand lace-making, to which I have also already referred.

So much for the labour side of the question. As to climatic conditions, which a few years ago would so seriously have hampered it, I have indicated a simple and economical expedient.

The history of sericulture is by no means devoid of romance. Romance, moreover, embodying both heroism and spite—through which, unhappily, the hero lost his life—also clings to the introduction of the silk industry into England.

No other industry, indeed, exists having had accorded to it such a measure of regal patronage—nay, of kingly help and imperial protection. Seeing the silk dress is that which clothes the form of our fair ones in the folds of greatest majesty combined with exquisite softness, it is fitting that the utilization of the labours of an insignificant worm to that end should have been due to a woman. It was *Teling-She* or *Si-ling-chi*, the principal wife of the Emperor *Hwang-ti*, who reigned over China 2640 B.C. —the time of Joseph's primacy in Egypt—who was the first to raise silk-worms. *She* very properly has been deified, and is now '*Goddess of* silk-worms.' At her shrine now worship emperors and empresses. Indeed, there is an annual feast and festival in her honour, at which the reigning Empress performs the ceremony of 'feeding the worms.'

From that time downwards we find that the industry received regal recognition—an abnormal thing in olden times—and aristocratic patronage. In the thirteenth century Venice and Genoa both ennobled their silk merchants. A knight of the second Crusade was he who planted the white mulberry in France. It was Henry of Navarre who, about 1603—taking a hint from the book of *Oliver de Serres*, 'the father of agriculture'—really made France the great silk country it now is. At first the experiments the King had urged his subjects to make

failed, and the people petulantly destroyed both trees and worms. But Henry persevered, shamed his subjects by turning a great orange-grove on one of his ancestral estates into a prosperous silk-farm, and at a cost of 1,500,000 *livres* succeeded.

Henry was probably emboldened to this step from the fact that in the time of Francis I. flourishing establishments for rearing silk-worms were to be found in Provence, at Avignon, and at Lyons. Much Imperial attention also was bestowed upon silk culture in connection with the palace at Fontainbleau. The climate, however, proved uncongenial to the habits of the insect. Such solicitude was doubtless prompted by two motives—the acquirement of wealth, and of the soft and beautiful material itself for kingly and queenly wear. We know, for example, that about this time Queen Mary, to preserve its use to the royal household and her courtiers, prohibited the weaving of silk by the middle classes.

But royal ladies, many centuries before Mary, had been charmed by the fabrics produced as the outcome of the industry of these queenly-guarded insects. They, too, would have wished to have preserved to themselves the monopoly of donning the soft textures. They, too, moreover, issued their proclamations with this object, but with penalties far more drastic than those of Mary, for the export of silk-worm eggs from China was punishable by death. Queen Mary's sumptuary law, made in 1554, was not without its severity: 'That whoever shall wear silk in or upon his or her hat, bonnet or girdle, scabbard, hose, shoes, or spur-leather, shall be imprisoned during three months, and forfeit ten pounds,' excepting from this restraint magistrates of corporations and all other persons of still higher condition. In the reign of James I. this absurd statute was repealed.

Emperors conferred upon empresses sole rights in the nascent industry, and hereupon hangs a romance, for another Emperor, upon the other side of the world, coveted both the material and the innocent little manufacturers of it, and for want of a better way stole the secret with some worms from the exclusive and (strange aberration of nature) secret-keeping lady.

The Emperor to whom I refer as having been guilty of romantically—yet so ungallantly—stealing the Chinese lady's secret was Justinian, and to him we owe the introduction into Europe of the labours of the silk-worm, which, until his time, had been wholly confined to the land of celestial cult. The means by which the secret of obtaining silk was conveyed to the Emperor displayed furtive ingenuity, bearing some analogy to the stratagem by which the manufacture of silk fabrics was subsequently conveyed to England. It appears that two Persian monks, employed as missionaries from India, having penetrated into China, 'here, amidst their pious occupations, viewed with a curious eye the quaint dress of the Chinese, the manufactures of silk, and the myriads of silk-worms, whose education, either on trees or in houses, had once been considered the labour of queens. They soon discovered that it was impracticable to transplant the short-lived insect, but that in the egg a numerous progeny might be preserved, and multiplied in a distant climate.' On their return to the West, instead of communicating the knowledge they had acquired to their own countrymen, they proceeded on to Constantinople, and there imparted to Justinian the secret, hitherto so well preserved by the Chinese, that silk was produced by a species of worm; and they added that the eggs might be successfully transported and the insects propagated in his dominions. They likewise explained to the Emperor the modes of preparing and manufacturing the slender filament—mysteries hitherto altogether unknown or but imperfectly understood in Europe.

By the promise of a great reward, the monks were induced to return to China, and there, with much difficulty, they succeeded in obtaining a quantity of silk-worms' eggs; these they concealed in a hollow cane, and at length, in the year 552, conveyed them in safety to Constantinople. The eggs were hatched in the proper season by the warmth of manure, and the worms were fed with the leaves of the wild mulberry-tree. These worms in due time spun their silk and propagated under the careful attendance of the monks, who also instructed the Romans in the whole

process of manufacturing their production. Thus it was that a secret that had been conserved for twelve or fifteen centuries came eventually to be laid bare and to be carried across the world.

The insects thus introduced to the Western world were the progenitors of all the generations of silk-worms which have since been reared in Europe and the western parts of Asia—of the countless myriads whose constant and successive labours are engaged in supplying a great and still increasing demand.

A caneful of eggs of an Oriental insect thus became the means of establishing a manufacture which fashion and luxury had already rendered important, and of saving vast sums annually to European nations, which in this respect had been so long dependent on, and compelled to submit to the exactions of, their Oriental neighbours. Justinian, however, took the budding manufacture into his own hands, made it an Imperial monopoly, and raised the prices of silk higher than those which he had formerly prohibited as excessive, so that an ounce of the fabric could not be obtained under the price of six pieces of gold. Thus the Emperor proved anything but a free-trader when he had obtained the secret. However, the rearing and manufacture did not long remain merely an Imperial prerogative, but were extended to Greece, and particularly in the Peloponnesus. The Venetians opened commercial relations with the Greek Empire, and continued for many centuries the channel for supplying the western parts of Europe with silks, which were now highly prized, for in the year 790 the Emperor Charlemagne sent two silken vests to Offa, King of Mercia. The Roman territories continued to supply most parts of Europe, until Roger I., King of Sicily, upon his invasion of the territories of the Greek Empire, led into captivity a considerable number of silk-weavers, whom he compulsorily settled in Palermo, obliging them to teach his subjects their art, and in twenty years the silks of Sicily had become famous.

The climate of Turkey, Italy, and the South of France proving congenial to the little workers, the industry continued to flourish

and extend in these countries, but did not make its way northwards. The vast sums of money they brought into the lands of their adoption did not escape the notice of the rulers of more northerly placed countries, and, as we have seen, attempts were made, and successfully, to coax them farther north. The British monarchs who displayed the greatest energy in this connection were Henry VI. and James I. The latter monarch made most determined efforts to establish silk culture within his realm. His *Sieur de la Forêt* and he in 1699 travelled through the Midland and Eastern counties and distributed 100,000 mulberry-plants. Had his energy and enterprise been tempered with discretion, success comparable with that attained by his French royal brothers would in all probability have resulted. But in regard to establishing the industry in England, instead of recklessness, especial care should have been exercised to counteract the disadvantages opposed to it by our climate. This appears not even to have been thought of. We find him, on the other hand, planting his mulberry-trees in the Eastern counties, and even in Scotland, the while entirely neglecting such obvious precautions as ought to have been taken—such, for example, as trying experiments in our Southern counties, where the leaves would have been available at an *earlier date*, the one thing wanting to insure success, the one omission which provided the rock upon which his ship of enterprise was wrecked. Quite recently experiments south of London have been made with gratifying success.

Even with the want of thought which characterized the introduction, the success was sufficient to induce the formation of a company in 1718, which obtained a lease of Chelsea Park for 122 years. Mulberries were planted, buildings erected, silk cultivated and woven; the capital, however, was outrageously disproportionate to the amount of business it was possible to carry on, and consequently the enterprise languished. Despite such warnings, it is interesting to note that as late as 1835 a company with a huge capital was formed, and they, too, commenced operations upon a most unsuitable and unpropitious site, namely, a wet district instead of a dry one, for we find their

first venture was to plant with mulberry-trees 80 acres in the county of Cork. They soon transferred their operations to Malta, probably after the bulk of their capital had been wasted.

Perhaps the most concentrated of James's efforts was his establishment of a 'mulberry garden' upon the site of the present royal residence of Buckingham Palace and its gardens. To do this, we are told, he 'imported many ship-loads of mulberry-trees.' Numbers of these were planted here and many 'round the Metropolis.' He conferred, by patent, the superintendence of '*the mulberry garden near St. James*' upon Walter, Lord Aston. Whether or not the matter was entered upon with any seriousness cannot be said. Certain it is that this mulberry garden subsequently became a pleasure resort, described by both Evelyn and Pepys. The former spoke of it as 'the best place about the Towne for persons of the best quality to be exceedingly cheated at'; the latter as 'a silly place, with a wilderness somewhat pretty.' Refreshments and 'things' for the inner man were there dispensed. We read of 'the mulberry tarts which Dryden loved.' The elite of society promenaded beneath the trees. Sir Walter Scott tells us that 'Dryden would repair hither along with his favourite actress, Mrs. Reeve.' Another writer, speaking of the poet, says: 'I ate tarts with him and Madame Reeve at the mulberry garden.' Great regret, indeed, appears to have been evinced when this recreation ground came to be again reinclosed.

> 'The fate of things lies always in the dark:
> What cavalier would know St. James's Park?
> For "Locket's" stands where gardens once did spring,
> And wild ducks quack where grasshoppers did sing;
> A princely palace on that space does rise,
> Where Sedley's noble muse found mulberries.'

Thus wrote Dr. King at the time, the princely palace to which he referred having been the mansion known as Goring House afterwards occupied by the Earl of Arlington, whose name, indissolubly linked with the spot, ought to be held in grateful memory by lovers of temperance, for it was he who, in the year

of the Plague (1665) brought hither from Holland the first pound of tea which was imported into England, and which cost him *sixty shillings;* so that, as John Timbs remarks, 'in all probability the first cup of tea made in England was drunk where Buckingham House now stands.'

It would appear that James also ordered the establishment of several other mulberry gardens in the then suburbs of London. A large one, for example, was laid out not far from Cheyne Walk, Chelsea. At all these, it appears, silk-worms were reared, and at some at least silk was obtained and spun. It is indeed evident that to James's recklessness, to the loose and luxurious habits of the time, and to the fact that there appeared not to exist at that epoch the right type of man to take up the subject with the care and circumspection it demanded, must be attributed the want of success, quite as much as to our climatic shortcomings. Indeed, it is surprising, having regard to these facts—to the circumstance that the culture was quite new to everybody concerned, that the mulberry-tree was foreign to our soil, and that no adequate time was allowed for it to mature before silk culture was actually commenced—that such success as attended the experiments did obtain. It is, moreover, clear that the success actually achieved was far greater than some writers would have us believe. Frequent mention is made of robes made from home-cultured silk, yet little was known about weaving at the time in England, and efficient weavers were not to be found.

What we subsequently came to know about silk 'throwing and weaving' we learned, by accident as it were, from the poor fugitive Huguenots. Now what do we find?—and it is most significant. That a few years after the Edict of Nantes, when these industrious and persecuted people had had time to settle down in the security of the asylum we offered, that silk culture was revived on a still more extensive scale. If the preceding efforts had proved wholly abortive, is it reasonable to suppose that the industry would have again been entered into, and this upon a broader footing? Yet this is what we find: that about a century

after James's first inception—viz., in 1718—the Huguenots having been massacred and expelled their countries in 1685, 'a patent was granted to John Appleton, Esq., for producing raw silk *of the growth of England.*' To carry out this undertaking, he was authorized to raise a fund amounting to a million pounds by joint-stock subscription. This he accomplished, dividing the capital into shares of £5 each. A deed of trust was executed, and enrolled in the Court of Chancery; directors for managing the concerns of the company were chosen by the subscribers. As a first installation, 2,000 mulberry-trees were actually planted, these forming but a small part of the vast quantity which the company contemplated raising. 'Many large edifices were erected at great expense upon the spot where the trees were planted at Chelsea, for the carrying on the business of what was then characterized as a glorious undertaking.'

Here, again, success must have resulted, for Thoresby, writing in 1723, says: 'I saw at Mr. Gate's a sample of the satin made at Chelsea of English silk-worms for the Princess of Wales, very rich and beautiful.'

It is not improbable that one of these mulberry gardens (referred to as 'not far from Cheyne Walk') was the site of the present Physic Garden, for 'Chelsea Park,' where the operations of the large company took place, stood to the north—not the south—of King's Road. It was enclosed by high walls, doubtless for the protection of the young trees, and was part of the property of Sir Thomas More, being in itself upwards of 30 acres in extent.

In this relation, I am anxious to draw the attention of the reader to the fact that these trees disappeared, not by decay, but by the axe of the encroaching builder. Indeed, a few that were spared existed until a comparatively recent date.

It may, indeed, be said that little or no difficulty was experienced in the growing of the trees, want of success in regard to the industry having been due alone, as pointed out by a contemporary writer, to *want of coincidence in the dates of hatching out of the worms and the appearance of the leaves in sufficient abun-*

dance to afford them a requisite nutriment. I have already shown that matters during the three centuries that have intervened have now become so changed that science is now enabled to deal with this disability in a practical and successful manner.

As an example of this, it may be mentioned that in a garden at Carlisle House was standing, in the middle of the last century, a mulberry-tree, which bore an excellent crop during the summer of 1753. Its shade was nearly fifty yards in circumference, and between four and five hundred pottles of fruit were gathered off it in one summer, whilst the ground all under and around the tree looked as if soaked with blood, owing to people treading upon the fallen fruit.

James requested all his nobles and courtiers to plant mulberry-trees. This, of course, they did, out of courtesy towards their Sire, but it is obvious, and, indeed, natural, that in most instances no effort was made to carry the project farther. It had the effect, however, of bequeathing to subsequent generations some grand arboricultural specimens in the form of noble and venerable shade-giving mulberry-trees such as the one to which I have referred. It seems strange in these days to speak of one of the densest portions of the City as being a suburb of London, yet just 'without' Bishopsgate stood a fine old house in a London suburb, with a gloriously romantic façade—that of Sir Paul Pindar—a reproduction of which is given in one of the illustrations. This, too, stood in one of the mulberry gardens of which mention has been made.

The *quasi*-agricultural industry of silk culture—the importance of which for his people James foresaw—would, however, have been small in comparison with the vast factory industries it would have given rise to, and to which—as a matter of fact—it did give rise in France and other countries. It would be beyond the object of this appendix to go into the matter of the conversion of the lustrous filaments presented to us by the industrious little insects into the beautiful fabrics which adorn our fair sisters, a conversion—that of silk-*manufacture*—which has given rise to factory industries of such gigantic magnitude elsewhere.

I cannot, however, refrain from touching upon it, for the purpose of showing the glorious opportunity we, in our country, have thrown away in this regard, due to that pernicious fallacy, inculcated among other equally fallacious principles of our so ridiculously called 'Free Trade,' which teaches (*in theory*) it is better—according to the *principles* of political economy—to purchase what we desire than to *make* it, but which *in practice* comes to the filling of foreign factories with industry and the starvation of our own workpeople.

It is the more deplorable when we reflect that not only, in this as in many other instances, others came and taught us what we should do—indeed, started us well with our manufactures—but that immense energy on the part of our own pioneers has been absolutely cast aside, energy and patriotic devotion going to the extent of the risk and sacrifice of their lives.*

At a time when we had but a dozen or so of *hand*-looms in our country France had many thousands. In Lyons, for example, there were *eighteen thousand* at work and *hundreds* of silk-factories; at Tours *eleven thousand* looms and *eight hundred* silk-mills at the moment—in 1685—when the cruel, diabolical, ay, Satanic '*Edict of Nantes*' was pronounced—an edict committing to the sword and the flames vast numbers of industrious and God-fearing workers, who formed the very life-blood of the great woollen industries of Flanders and the silk industry of France, so that *tout-à-coup* Lyons for her 18,000 looms could find but 4,000 weavers, Tours with her 11,000 looms scarce more than a thousand operatives, her 800 mills becoming all closed with the exception of threescore and ten.

Fleeing for their lives in all directions, many of these valuable and honourable people found safety upon our shores. They taught our people of the time not only many useful arts and processes, but that they, uninterfered with either in religion or trade, could lead such honest, quiet, and industrious lives as to set valuable object-lessons and examples before the eyes of our

* See reference to the romance of the introduction of silk manufacture into England by John Lombe (*seq.*).

far less skilful peasants. Yet, with all this unexpected and undeserved advantage and impetus thus imparted to us, our lax mode of conducting our business and our disregard for the lessons Nature teaches us daily in regard to self-protection has prevented us from reaping but a tithe of the benefit we might have done from the frightful historic episode.

It is estimated that no less than a million people were driven to their death or to foreign shores, chiefly to England. The refugees, including among them no fewer than *fifty thousand* of their country's ablest workmen, settled amongst us.

Canterbury was one of the first settlements of silk manufacture thus induced, the good bishop giving a portion of the crypt of Canterbury Cathedral for weaving-rooms and another portion of the chapel for the refugees to worship in, which, singularly, has remained in use down to the present day by the Huguenot descendants, although the manufacture and dyeing of silk has long ceased to be carried on in that town.

Many of the refugees established trades in Norwich, especially the Walloons, who introduced woollen manufacture; amongst other industrial processes was silk manufacture in several of its branches. Three hundred Dutch and Walloon families settled in the old East Anglian cathedral town, and introduced silk-weaving and the flowering and striping of silks and damasks, processes which shortly became the principal branches of trade in Norwich. This was done under license granted by Queen Elizabeth in 1564, through the influence of the Duke of Norfolk, and at his charge, until the settlers shortly afterwards, by their industry, made themselves self-supporting. The silk trade of Norwich has been allowed to decline, and is now mainly represented by the manufacture of silk crêpe for mourning, in which it has almost a monopoly, and by the manufacture of dyed spun silk into a variety of decorative furniture cloths.

A number of the refugees settled at Spitalfields, and of these a portion subsequently migrated to Dublin, and there established the manufacture of poplins, formerly called tabinets—fabrics for dress purposes, for which the French had been celebrated, but

which by this means became largely supplanted by 'Irish' poplins. They are made of silken warp and woollen weft.

On the introduction of the power-loom and steam-engine others migrated to Manchester and its neighbourhood, as well as to Macclesfield, Coventry, Leek, Congleton, and other northern manufacturing towns then rising into some importance, to which their advent gave valuable impetus.

English silk manufacture then gradually became settled and consolidated, and constituted a very important branch of English commerce, when at one time about a million people were directly or indirectly engaged in this beautiful industry.

It has met with many vicissitudes, the most important resulting from the French Treaty of 1860, since which time the trade has dwindled down to very small proportions, and the population of the principal silk towns has very seriously diminished.

Speaking of the incursion of the Huguenots and the splendid material implanted in our midst, a great authority upon the subject says: 'Alas! this happy tide, so beneficial to our interest for over a hundred and fifty years, once again has retreated whence it came, carrying with it, not the workmen, but *their trade*; while France owns a development with which none probably is to be compared. The reason of our disaster may be summed up in one word, *neglect*. We have neglected the progressive and scientific spirit of the times, and to fall behind in this age of competition is—extinction. While France has her Lyons Chamber of Commerce, with a laboratory for the scientific investigation of matters concerning the manufacture of silk, her *Syndicat de l'Union des Marchands de Soie*—and similar institutions, as well as her important silk journals, England for long had not even a silk journal, and has trusted far too much to individual enterprise. Her technical education until lately has been *nil*, while the artistic exigencies of the subject have been left entirely out of reckoning. No doubt, a more immediate cause of the decline of the English industry is to be found in the French Treaty of 1860, *giving France the opportunity of sending her goods to our markets duty free, which rapidly ousted the home manufactures,*

because they are cheaper and more suited to modern taste. But, in reality, this cause is involved in the larger one of our want of knowledge and exertion. Had we been armed with these, our goods would have stood their ground better in emergency. Delay in removing the tax would have simply kept us the longer ignorant of our own ignorance, as compared with the work of foreign rivals.

'That competition in the matter of cheapness must entail a keen struggle to us it is only fair to admit, since the cost of the living of our poor and the wage that they demand are great, and the hours of labour are short, in relation to the more cheaply-producing Continental centres. *With frequent strikes, with the high duties imposed abroad* on our exports, and with the freaks of fashion, we have likewise been heavily handicapped. But these evils are not insuperable, as it has been amply proved in other directions; besides, they show a tendency to lessen. And such evils do not touch our national pride in the same way as the discovery of our inability to cope with the ingenuity of others and our defeat in the match with our more skilful and better-informed Continental confrères, even though that skill be occasionally a species of "black art," which is in principle antagonistic to the English manufacture. As to fashion, she is a fickle goddess, for there is every chance that what is not the mode may again become so.

'There is, in fact, no adequate reason why we should not resume, *and extend*, the fair share that we once held in the beautiful branch of imperial industry. We have a climate all that can be desired—more humid, perhaps, than any; we have machinery surpassed by none; and brain-power, and technical instruction of science and the arts is slowly beginning to be felt.'

Happily, the laudatory change of attitude of all classes throughout our land towards the urgent necessity of fiscal reform, and the rude awakening they have received from a dream of half a century by the fact that dozen by dozen our factories are compelled to close their doors to the British work-

men, give us every reason to hope that the prognostication of this authority will shortly be put on a footing to be realized.

I must not omit to refer to one more proceeding upon the part of King James—a more thoughtful one—which, due to the more practical and greater enterprise of the inhabitants of the 'New World,' brought forth good, which has lasted down to our time. I refer to the introducing by him of silk-worm culture into his American colonies, for he urged the Virginia Company to promote the cultivation of mulberry-trees and the breeding of silk-worms. We find that in 1619 he sent eggs and trees to Virginia, and offered every encouragement to the settlers.

Three years later he addressed a letter to them expressly on this subject, conveying to them strict injunctions that they should use every exertion for this purpose, and should stimulate the colonists to apply themselves diligently and promptly to the breeding of silkworms and the establishment of silk works, bestowing their labours rather in producing this rich commodity than to the growth of 'that pernicious and offensive weed,' tobacco, an article to which his Majesty has recorded and published his violent aversion.

An old rhyme of this time tells us that

> 'Where Worms and food doe naturally abound,
> A gallant silken trade must there be found.
> Virginia excels the world in both—
> Envy nor malice can gainsay this troth.'

Here, again, the experiment was entirely successful as regards the raising of the worms and the production of cocoons. Here again, also, it was subsequently allowed to languish for want of interest taken in it, for naturally the planters neglected it in favour of tobacco-raising, which promised greater returns. The attempt met with greater success in Georgia than elsewhere in the colonies. There 20,000 pounds of cocoons, yielding nearly a ton of raw silk, was the outcome.

In 1735 one Oglethorpe brought eight pounds of silk to England, and this was made into a dress for Queen Caroline. In Pennsylvania and New England the culture was also success-

ful, most of the silk being sent abroad. Governor Law, in 1747, wore the first coat and stockings made from New England silk, and his daughter wore the first silk dress.

America was also indebted to the French Huguenots, who first introduced the manufacture of silk into Carolina, but for the greater part they imported the raw material they needed. In Connecticut, just before the Revolution, silk manufacture was active, but at that time and for a good many years after the manufacturing was confined to the production of sewing silk, which was done as a home industry.

In the same year (1825) Congress referred to the Committee on Agriculture an inquiry into the culture of silk. In the following year this Committee reported favourably upon its promotion, stating that the imports of silk were in 1825 double the value of the exports of bread-stuffs. In 1828 the Secretary of the Treasury issued a letter on silk culture, and this with several treatises were circulated broadcast. In 1831 most of the States offered bounties and premiums on trees, cocoons and reeled silk. But it was not until 1837 that the fever thoroughly caught; then the whole country appears to have gone wild. Orchards of *Morus multicaulis* were planted in every State. Farmers set their wives and children to feeding and rearing the worms. Companies for raising and making silk sprang up like mushrooms. Trees advanced in price by leaps and bounds from ten cents to fifty cents, then to a dollar, and even as much as five dollars were realized for one-year-old specimens. Though on paper it was proved that an acre of trees brought in $1,000 worth of silk, the farmer managed to sell $6,000 worth of trees off three-quarters of an acre. We read that: 'A Long Islander having sold a number of trees, started off to rebuy them at fifty cents; of course he did not succeed, but his ruse answered, for he promptly sold the remainder of his stock at a dollar apiece.'

In 1825 began that extraordinary and disastrous silk excitement which can only be compared to the tulip craze in Holland and the South Sea Bubble in England. In that year Peter

Stephen Duponceau, an able lawyer who had gone out with Baron Steuben and had become an American citizen, became interested in the encouragement of American silk culture, and introduced the subject to Congress. A general interest was awakened, and many silk societies established. The effort made in 1830 to introduce the Chinese mulberry to replace the white mulberry-tree, which until that time had been used, increased the fever of speculation. Everybody wanted to grow rich by the new industry and from the new tree. Prices of the little trees rose extravagantly high, reaching, indeed, five dollars for a small cutting less than 2 feet in height. A 'corner' appears to have been made in them until at last in 1839 the bubble burst and thousands of speculators were ruined and many plantations were ruthlessly uprooted, the trees being sold at a fraction of a cent apiece to be used as pea-boughs.

The check thus given to the American silk industry is felt even to this day. The manufacture of silk continued to increase, however, for according to the census of 1880, 2,562,236 pounds of raw silk were imported, while the amount of the native product, for sufficient reasons, declined.

During the centenial year, the Women's Silk Culture Association was formed in Philadelphia, and it is largely owing to the efforts of this society that a new interest has been awakened in silk-raising. A 'filature' was established in 1886 by the Agricultural Department at Washington for the reeling of silk from American cocoons, and many eggs of the large Milanese variety of silk-worms distributed. Associations were also formed in Kansas and California. It did not, however, suit the manufacturers to buy the home-produced cocoons. They preferred to buy from abroad, because they could purchase in large quantities and already reeled. There being a heavy duty on imported woven silk and none at all on raw material, this course was obvious. To encourage the new industry, Congress in 1886 made a yearly appropriation of $15,000, enabling the association to buy the cocoons direct from the farmer, reel them, and then sell them to the manufacturers. Many farmers, especially in the

South, took up the industry, and it was in a flourishing condition, and on a fair way to become self-supporting when, in 1892, owing to some inadvertence, Congress neglected to renew the appropriation. Silk culture thus received another serious setback. It may be interesting to add that no complaint has ever been made against the quality of American-grown silk. The manufacturers naturally objected to buying the silk unreeled and in trifling quantities, which would not pay them to put down reeling and throwing plant to deal with. Hence the Women's Silk Culture Association—to foster the industry—undertook the filature and acted as a go-between or middleman to the manufacturers.

Hence in this relation women played an important part in connection with a commercial transaction.

It is probable that the Pan-American delegates, during their tour through the country, received no more gratifying evidence of the intelligence and goodwill of American women than the beautiful flags presented to them by the Women's Silk Culture Association, made of silk grown in the United States and reeled, dyed, and woven in the city of Philadelphia. In this connection an American writer says: 'It is more than likely that there were many of our citizens who were amazed to learn that silk of good quality is easily grown in this country, and that it may soon become one of the most important smaller industries. I use the term "smaller industry" not because silk culture is insignificant, but because it is usually, like poultry-raising, most profitably carried on as a valuable addition to general agriculture, and a not unpleasant way for the women of the farm to earn a few hundred dollars every year.'

The history of silk culture in America, where wages are high, is interesting as showing that in no case has failure been attributable to lack of proper climatic conditions. From Massachusetts to Florida, and from Pennsylvania to California, the silk-worms have thriven and spun as well as in their native land. From this it will be seen that, if we call upon science to effect a compromise between the climatic conditions of America and England, this interesting industry, so well suited to

Italian Chest in which John Lombe conveyed the parts of the Silk Loom to England.

The Birth-place of a Great Industry: John Lombe's Mill at Derby, the first Silk Mill erected in Great Britain.

women, might well be made to form one of the industries of Garden Cities.

I have mentioned romance in connection with the introduction of the silk industry into our country. Could anything be more pathetically romantic than the work in this connection of John Lombe, whose name will ever be remembered with veneration for his patriotic and self-sacrificing conduct? He in 1715 resolved upon visiting Italy, and acquiring at any risk and any cost a knowledge of the process adopted in that country, and of introducing it into England. Having well matured his plan, he started on his enterprise. On reaching Italy he found difficulties greater than he had anticipated, for the jealousy of the Italians guarded their secret with the most watchful care—and well they might, for a decree had gone forth from the King of Sardinia that divulgence of the secret would be punishable by *death*. Finding that an examination of the machinery and processes was impossible, and failing to gain open admission to the works, he, nothing daunted, bribed some of the workpeople, and by their connivance, in the disguise of a common workman, he made several secret visits to the mills, and at each time carefully noted down everything he saw, making sketches of parts of the machinery, so as to perfect himself in the operation of throwing. His plot was before long discovered, and he was obliged to fly with the utmost precipitancy, bringing with him, however, his notes, sketches, and portions of the machinery, and, better still, a mind which had grasped and comprehended the whole process. He fled to avoid assassination, and took refuge on board ship, and returned to England with a full knowledge of the trade he had run such imminent risk to acquire.

Lombe was accompanied in his flight by two Italian workmen, whom he had bribed, and who risked their lives in his scheme. On arriving in England, he at once fixed on Derby as the scene of his operations, and in 1717 arranged with the Corporation for an island on the river Derwent at the yearly rent of £8. On this island Lombe erected, at a cost of £30,000, the mill called 'the Old Silk Mill.' The ground being swampy, Lombe, before he

began to build his mill, caused immense piles of oak, 20 feet in length, to be driven close together by means of an engine, which he contrived for the purpose; and on these piles was laid a stone foundation, on which were turned the stone arches that support the walls.

During the four years occupied in the erection of the mill, Lombe, in order to save time and to raise money to carry on the works, hired rooms in various parts of Derby, and arranged with the Corporation to use the Town Hall, where he set up machines, which were for the time worked by hand. These mechanical contrivances more than fulfilled his expectations, and he was enabled to sell thrown silk at much lower prices than it could be obtained for from the Italians. By the time his large mill was completed and his machinery in active operation, he had permanently established the silk-throwing trade. In 1718 he obtained a patent for the sole and exclusive property in the mill and for the 'throwing' of silk—*i.e.*, the combination of a number of cocoon filaments into a thread, in readiness for weaving—for fourteen years, and, with the aid of his Italian workmen, carried on his new manufacture with great success.

'But, alas!' says William Hutton, the venerable historian, who himself had worked in the mill, 'he had not pursued this lucrative commerce more than three or four years when the Italians, who felt the effect of the theft from their want of trade, determined *his* destruction, and hoped that of his works would follow. An artful woman came over in the character of a friend, associated with the parties, and assisted in the business. She attempted to gain both the Italians, and succeeded with one. By these a slow poison was administered to John Lombe, for he fell ill, and lingering two or three years in agony, died. The Italian fled to his own country, and the woman was interrogated; but nothing transpired, except what strengthened suspicion. Grand funerals were the fashion, and perhaps the most superb inhumation known in Derby was that of John Lombe. He was a man of quiet deportment, who had brought a beneficial manufactory into the place, employed the poor, and at advanced

wages, and thus could not fail to meet with respect, and his melancholy end excited much sympathy.'

Lombe was buried in All Saints' Church, Derby. Dying a bachelor, his property fell into the hands of his brother, William Lombe, who shortly afterwards, being of a melancholy temperament, shot himself. About 1726 the mills passed to his cousin, Sir Thomas Lombe. In 1732 the patent expired, when Sir Thomas petitioned Parliament for a renewal, and pleaded 'that the works had taken so long a time in perfecting, and the people in teaching, that there had been none to acquire emolument from the patent.' The Government declined to renew the patent, but granted the sum of £14,000 to Sir Thomas as compensation on condition that he would prepare, and deposit in the Tower of London, an exact and faithful model of his machinery, for the inspection and advantage of others who might purpose constructing and carrying on similar works. The Act authorizing the issue of the money mentions, among other causes which justified the grant, the great obstruction offered to Sir Thomas Lombe's undertaking by the King of Sardinia in prohibiting the exportation of the raw silk which the engines were intended to work.

Soon after Lombe's patent had expired a mill was erected at Stockport, and this was followed by others in Derby and in various places. The immediate result of Lombe's patriotic and life-sacrificing exploit was that in a little time there were about 400 silk-throwing factories in England, employing, it is computed, considerably more than 100,000 operatives.

The chest in which John Lombe brought over to England his spindles and various matters connected with the trade is shown. It is one of the most richly carved and painted chests of its kind extant. The chest is, of course, much older than Lombe's time, and, apart from its association with his name and career, is a remarkably fine example of art.

When industrial development presents to us such noble and heroic examples of devotion to its evolution, it is certainly sad to find it so lightly held and people starving where might be plenty.

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The First Electric Railway.

CHAPTER VII

LOCOMOTION, URBAN AND INTER-URBAN

'Hurrah! for the mighty engine,
As he bounds along his track;
Hurrah! for the life that is in him,
And his breath so warm and black;

'And hurrah! *for our fellows* who in their need
Could fashion a thing like him—
With a heart of fire, and a soul of steel,
And a Samson in every limb.'

'SANDY' ANDERSON.

'And last of all, with inimitable power, comes the potent agency of steam. In comparison with the past, what centuries of improvement has this single agent comprised in the short compass of fifty years! Everywhere practicable, everywhere efficient, it has an arm a thousand times stronger than that of Hercules, and to which human ingenuity is capable of fitting a thousand times as many hands as belonged to Briareus. Steam is found in triumphant operation on the seas. It is on the rivers, and the boatman may repose on his oars. *It is on the highways, and exerts itself along the courses of land conveyance.*'—DANIEL WEBSTER.

URBAN locomotion has become one of the most important factors in civic life. It is a matter now engaging the most serious attention of municipal

authorities: one, moreover, that has made the most remarkable strides during the last five years—millions having been expended in tramways alone. I have elsewhere mentioned the great apathy of the British in regard to the construction of roads, and the trouble that arose from neglect in providing proper means of communication between town and town. Much the same applies to locomotion in towns, but whereas in regard to the former there was no ground for excuse, it must be admitted much may be said in mitigation concerning the latter.

The answer to the question why this should be is easily given. It is due to the manner in which our cities were originally laid out—or it would be more correct to say were *not* laid out. Perhaps in no other manner does the value of broad, straight streets, *boulevards* and avenues, come out more convincingly than in connection with urban locomotion. For when in the United States horse-drawn tramways, cable-hauled tramways, and, lastly, electrically-propelled tramways, were in operation in towns to the extent of hundreds of miles, scarcely any evidence of the innovation was noticeable with us. Until quite recently the Continent, also, was far ahead of us. This is due, in great measure, to the modern style of laying out American towns, embodying, as it invariably does, broad and straight streets; whilst upon the Continent it has been due to the fact that similar

thoroughfares, originally laid out by the Romans, offered the requisite facilities.

There are certain classes of Englishmen always, apparently, very proud and contented if they can introduce into our midst some foreign innovation. They appear to value such far more highly than 'home' products of cerebral effort—in accordance with the proverb, 'A prophet is not without honour save in his own country.' Yet it often happens that such inventions are, in reality, British; but, in disgust at want of appreciation, they have been first put into execution elsewhere. Such is now occurring in regard to street tramways. Until within the last five years we were riding in similar tramway-cars in our own great and important towns as we were wont to do many years ago in small and unimportant towns in Holland, Belgium and Germany, to say nothing of America. It is now some twenty-eight years since I first made a tour of inspection of the then existing Continental electrically-propelled tramways, beginning at the pioneer, shown in the frontispiece to this chapter, passing on to the first military electric railway—that between Berlin and Lichtenfelde (rail conduction)—the first overhead (shuttle contact) at Frankfort, and so on. Yet at that date there was not a single example in our own country. Now, it would seem, we, with intemperate haste, are striving to rectify the omission. We awake to the knowledge that they *pay*, and straightway keep American

engineers—ay, and American financiers—busy in fulfilling our laches.*

To such an extent is this now taking place that it is not proving an unmitigated blessing in regard to the congested streets of our great towns. The burning question is not alone the *means of locomotion*, but the *means of regulation* of traffic. Nevertheless, one finds municipal authorities, whilst complaining as to the difficulties of the one, absolutely blocking up narrow streets with their huge tram-cars—streets quite unsuited to that mode of locomotion. I have mentioned, however, that they *pay*, and that, apparently, is taken as sufficient justification.

It cannot be gainsaid that tramways constitute both a public convenience and a public nuisance Four or five years ago it might have been urged that in large towns they were *necessary* nuisances, for no other forms of self-propelling traffic were available. This, however, can scarcely with justice be said to-day.

Seeing that Garden Cities will be laid out with full knowledge of what modern engineering has now to offer, as well as of its own requirements—since neither its population nor its extent can be increased when the scheme shall have been completely consummated—it is sincerely to be hoped that the vital

* The electric tramways of the United States carried last year three times the population of the earth. They killed 1,218 persons and injured 47,429.

question of urban locomotion will receive the care and solicitude its importance merits.

Primâ facie, it might be thought that the laying-out of a Garden City would present a unique opportunity of also laying-out a very complete system of tramways. Undoubtedly it would. I am of opinion, however, that such a course would be not only financially unwise, but also one not the best calculated to serve the convenience of the inhabitants at a later date.

I am not aware of any case occurring under similar conditions to those of the first Garden City in regard to the provision of means of urban locomotion. It is usual to have, 'Given a population, to find the best means of providing for its locomotive convenience.' In this case we have, 'Given a tract of land without population' (but to be populated; ratio of increment unknown; future density of component districts unknown), to 'provide proper locomotive facilities, ample for futurity, yet economically proportionate during inception and development.' That would appear to be the *quod est faciendum*.

The correct solution is obviously *not* the immediate installation of a complete and costly system of tramways. It is equally obvious that the most apposite solution would be some system providing increment of carrying capacity *pari passu* with increment of demand. Seeing that the cost of a few street cars—*i.e.*, a capacity proportional to the

demand for some considerable time—would bear but a small proportion to the total cost of a considerable immediately provided mileage of tramway, it is clear that a tramway system does not lend itself to the conditions presented. It is equally clear that the capital expenditure which would be absorbed in a tramway system would be far more judiciously spent in the provision of carefully paved streets suited to *mixed* traffic. This, I think, points conclusively to the wisdom of this being done in combination with a system of self-propelling transport composed of units—such that they may be augmented in economic proportion to the increment of demand.

This can only be done by the adoption of what is known as 'self-contained,' mechanically propelled vehicles—*i.e.*, vehicles which do not derive their motive energy extraneously, as is the case with electrically propelled and cable-drawn tramcars. This would point to the advisability of providing a system of self-propelling 'common-road' vehicles—*i.e.*, those not requiring to be run upon smooth rails. Reflection, however, will show that this would not properly meet the case of Garden City development at the outset, for we have to deal with a tract of land entirely without roads, serving the region whereon the town is to be reared. I am therefore of opinion that, under the peculiar circumstances, the best course would be to lay, in cheap and temporary manner, a certain length of railway (of standard gauge, 4 feet 8½ inches), connecting

this with the railway system, and running upon it self-propelling motor vehicles and 'tractors' furnished with variable gears, thus rendering the latter capable of dealing with light loads at high speeds and heavy loads at low speeds. By this means the temporary rails—as also the sleepers, which are always saleable—would serve the dual purpose of goods transport during the building operations. Such a temporary line might be so arranged that, when re-laid, it would serve the residential portion of the city, so that season ticket-holders between it and the Metropolis might be spared the waste of time in going to and from the railway-station. This would be done by the running of a railway motor-car—in other words, a self-propelling motor-coach—running express between the Metropolis and the city. On the arrival at the latter destination the motor-coach then running in the streets would make domiciliary stoppages, as is the case with ordinary street cars. By this means, it will be seen, residents would be able to travel to the London terminus *from their own doors.* The railway motor-coach is a very recent innovation, particularly suitable for fulfilling two specific conditions—(*a*) economically providing a rapid and frequent service to sparsely-populated districts, and (*b*) providing a fast suburban service for a limited number of passengers, the speed being gained, not by high maximum running speed, but by means of the rapid acceleration, or 'pick up,' of speed.

Perhaps in no sphere of utility could applied science display its potentialities and demonstrate its great value to the inhabitants of a new city better than in regard to inter-mural communication, in personal conveyance and merchandise transport. It is a sphere demanding the most serious solicitude and pensive prescience on the part of both the civil and the mechanical engineer, for obviously an efficient system of inter-mural locomotion is largely dependent upon the apposite laying out and mode of construction of the streets and roads which shall subsequently form the veins and arteries by which shall be maintained the personal and material circulation.

This being so, I would wish to say a few words in regard to the construction of roads and streets before considering a scheme of locomotion specially suited to Garden City.

We in this country have little cause to be proud of our roads; we have never adequately appreciated their importance, and we were the last of the civilized nations to construct them. Little more than a century has elapsed since an attempt at road-making was made by us—a surprising fact when we consider that eighteen centuries ago the Romans constructed for us most solidly-built arteries of invasion and circulation paved throughout their length in the most substantial manner. These, however, have been allowed practically to disappear, the carefully-wrought paving-blocks of the great

MAP
TO ILLUSTRATE THE
ROMAN ROADS IN BRITAIN
BY
THOMAS CODRINGTON, M.INST.C.E., F.G.S.
1903
IRISH CHANNEL
ENGLISH CHANNEL

routes of intercommunication—a benefit for the multitude—having been removed to build the dwellings of the isolated squatter, of value alone to the individual.

By the courtesy of Mr. Thomas Codrington, M.I.C.E., I am enabled to present a map showing the Roman roads in Britain.* These ancient arteries of communication where they now exist are, of course, beneath the present surface of the land, and it may be interesting to mention that the matter of opening up these early roads—characterized as they are by firmness of foundation and straightness of course—for motor traffic is now receiving the serious attention of the Roads Improvement Association. Were this done, greatly increased inter-urban communication would be effected without interference with the present highways. The straightness of the Roman roads would render them well adapted to high-speed road travel, whilst, strangely enough, as the Roman roads usually passed around the towns, motor traffic could be in many cases carried on without the hindrances caused by the crossing of towns.

Of course, it is very interesting to be told that many of our roads were surveyed and constructed by a blind man. But this only serves to show the apathy and shortsightedness of our forefathers.†

* 'Roman Roads in Britain,' T. Codrington.

† In the course of a discussion at the Institution of Civil Engineers in 1879, Mr. (now Sir H.) Rawlinson, C.B., said: 'It was not a very profound remark that good roads were at the

In a word, British roads give but little evidence of engineering skill, whilst the skill of the Continental engineer—be it by the construction of broad level and straight roads, suited even to the high speed horseless locomotion of to-day, or by the gentle and uniform gradients, achieved and maintained in the face of great engineering difficulties in the construction of roads over the Alpine chains—is prepollent to command our respect and admiration. The roads of Great Britain are mainly the network of boundary lanes and accommodation easements of past generations, and their sinuous courses, their narrow confines, their equine heart-breaking acclivities, their difficult angular intersections and blind end connections, will prove of greater disadvantage to the more fleetly

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root of civilization. Yet no nation that had ever made much progress in civilization ever neglected its roads; and the nations of antiquity which had remained stationary had not been road-makers. The Romans, who were the greatest civilizers and conquerors, were also the greatest road-makers. The English within the last two centuries had become great road-makers. They were in a compact island, and were the wealthiest people the world had ever seen; and, as a matter of course, had grown into that state of civilization in which roads had become necessary. They need not, however, flatter themselves too much, as it was only recently they had more fully commenced to learn that roads were really necessary to the enjoyment of wealth. When he went into Lancashire in 1863 to assist in administering the Relief Fund, he found large towns, Bolton, Blackburn, and others, in which there were miles of streets—that is to say, tracks—laid out, having houses on both sides, along which wheels could not travel in wet weather.'

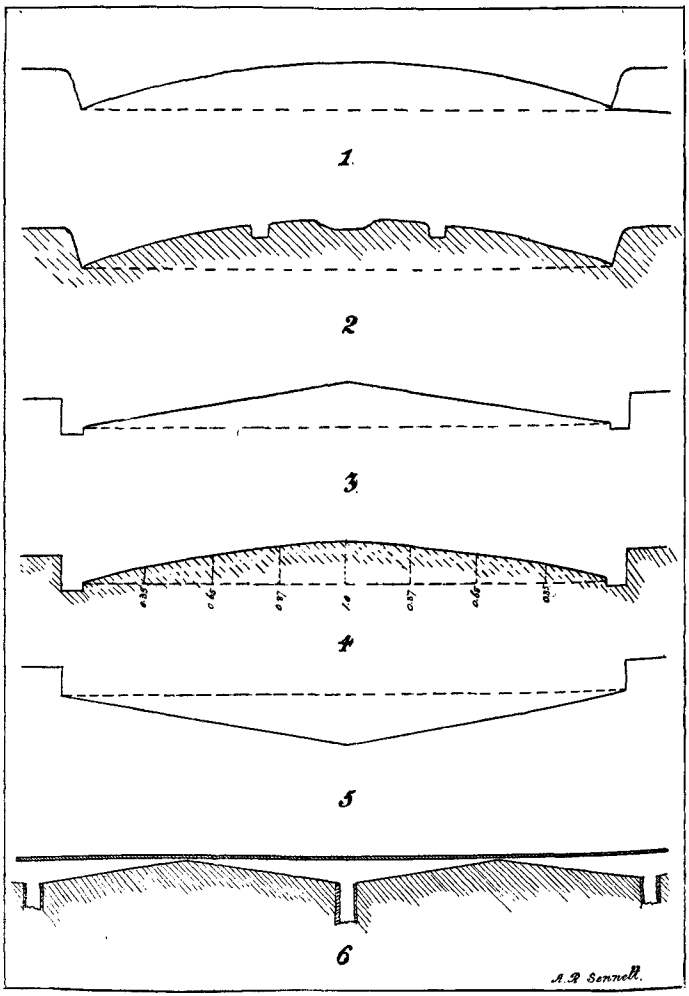


Diagram showing Cross-section of Ordinary and Invert Roadways.

(1) Ordinary country road ; (2) the same worn with waggon-ruts ; (3) diagram of 'crown' formed by two inclined planes ; (4) scientific form of road section, the parabola giving minimum tractive resistance ; (5) the two inclined planes inverted ; (6) longitudinal section of 'invert' roadway, showing continuous grid and inclined waterways leading to medial gulleys.

moving generations of the future than they have to the more deliberate users of them in the past. Let us, therefore, be guilty of no want of forethought in a matter of such vital importance as the highways of a modern city.

At the outset we may ask ourselves the question, Is the form of road found most suitable for the connection of town to town also the most apposite for adoption *within* the towns? I venture to suggest it is not.

The form usually given to roads of communication is shown in Plate I., Fig. 1, from which it will be seen that its surface is curved; in other words, it is furnished with a very considerable 'crown.' This contour is given to it for the purpose of preventing rain-water remaining upon its surface, whereby its crust is softened, and inceptive and receptive depressions formed, which, retaining the water, rapidly increase in magnitude with the traffic. Were none but mechanically-propelled traffic to pass over a road such as that shown, the object would be accomplished; but, unfortunately, horse-drawn traffic has two destructive effects upon the road surface: the first, a rut-forming expression of the face; and the second—which is much more serious—a pounding and pulverizing action due to the impact of the horses' iron-shod hoofs. The result is that a country road rapidly has the apex of its 'crown' transformed into a medial depression, as seen in Fig. 2, bounded by a pair of ruts as shown. It is obvious that

the object aimed at—viz., efficient drainage—is soon defeated, and in its place a central canal or water receptacle is formed.* It would be interesting to know what would be the reduction in expense were horseless traffic alone permitted on a given road, but certain it is it would be very great.

The form of road shown in Plate I., Fig. 1, is certainly the best and most economical for the open country, where only natural drainage is had recourse to. In towns and suburbs, however, artificial drainage is resorted to, macadamization is discarded, and the road surface 'set' with hard and *quasi* unyielding blocks. We may, therefore, well pause to consider if it be also the best and most economical and efficient form of highway for urban uses. Indeed, we ought to commence by considering whether a crowned road is the most suitable for streets.

I hope to be able to show that another contour —that, indeed, to be found in some instances in medieval towns—would prove, especially when combined with modernizing modifications, of far greater utility and efficiency. In Fig. 5 is shown the form of civic highway I propose. It has, as will

* The curve shown in Fig. 1 is that of a portion of a sphere —the curve given to the crown in ordinary practice. Mr. G. F. Deacon, M.I.C.E., an authority on road-construction, however, arguing from the points of view of both rapid water removal and the minimizing of tractive effort, states—*vide Mins. Proc. C. E.*, vol. lviii., part iv.—that the correct contour is a parabola, as shown in Fig. 4. The theoretically perfect section would be two planes meeting at the centre, as shown in Fig. 3.

Self-cleansing Street and Subway (Sennett).

be seen, no crown, but instead is composed of two very slightly inclined planes* joining at the centre by means of a continuous grid, beneath which is a single series of gullies without grids, each of these gullies being connected lengthwise of the street by inclined gutters of far steeper inclination than could be given to them upon a road surface. Effective provision would thus be made for very rapid removal of storm-water. This is, I think, made sufficiently clear in Fig. 6, which shows a *longitudinal* section of the roadway, with three of the medial gulleys joined by the medial waterway, with its steep inclines, beneath the grid passing down the centre of the carriage-way. This construction of roadway is more clearly shown—in transverse section—in Plate II., the medial continuous grid being shown at 3, one of the gulleys at 4, with its drain 21. The general appearance of a road constructed upon this system will be better understood from the frontispiece to Chapter II., which shows a portion of Piccadilly, opposite the Automobile Club, as it would appear with its medial grid and the system of automatic cleansing in operation.

If one stops to reflect it is certainly a stupid thing to place a gully at the edge of a busy street, necessitating a gutter where persons are constantly stepping into the roadway in order to enter vehicles.

* For the sake of clearness the curvature is exaggerated, the vertical scale of the figures in this plate being about six times that of the horizontal.

Moreover, in crossing a street having a 'crown,' two gutters have to be negotiated where one would suffice. In the case of an 'invert' street, such as I propose, it would not be necessary to cross any gutter at all, nor even the grid, for this would be discontinued at each of the crossing 'islands,' which I propose should be at each centrally placed lamp-standard, the base of which I would quadricate to form 'fenders.'

I have ventured, in the preceding volume, to impress the great importance in regard to public health of *clean streets*. A little reflection will serve to show that the cleanliness of urban thoroughfares constructed upon this plan would be altogether superior to those made and cleansed according to present-day practice. The dirtiest portions of streets are the gutters; in them accumulates mud and slush that has to be negotiated before the road can be crossed or a vehicle can be entered. Thus the gutters are responsible for the destruction every year of many thousands of pounds' worth of clothing. To appreciate the effect, one has only to note the appearance of an untenanted, and hence uncleansed, shop, separated by a narrow pavement from the roadway of a large town. It will be found that even in a few days the shop-front will be smothered with mud, whilst a longer period suffices to so completely encrust the exterior with mud as to render even the colour of the paint unrecognisable. Now all this is going on whilst passengers are passing along

the footways, and from it can be estimated the damage to clothing, to say nothing of the unpleasantness of urban street life. It has been truly said that the filth of streets is the shopkeeper's best customer.

I have elsewhere referred to the great battle which engineers are incessantly waging against friction. Nothing more appropriate could be taken in exemplification of the importance of this militant factor than the effect on locomotion of the *character of the surface* of streets and roadways. At the present epoch, which sees such a revolutionary change taking place in street locomotion, the substitution of mechanical propulsion for horse traction, one needs must ask, in the case of the laying out of a new city, what ought to be the character of street surface. Both from the point of view of sanitary efficiency and minimum tractive effort, it is obvious the smoother the street surface the better. Moreover, from both points of view, the harder and least absorbent surface is also the most efficient. But before a decision can be arrived at, one has to consider the class of traffic to be run over the surface. If it is to be mixed traffic —mechanically propelled and horse-drawn—then it is clear an ideally perfect surface cannot be had recourse to, because the *desiderata* of each class of traffic is not only different, but opposed. Indeed, in regard to horse traction, the requirements of the horse and the vehicle drawn by it are in conflict. The ideal or smooth surface represents kindness towards the animal by reason of its beneficial re-

duction in draught. Thus the work the horse is called upon to do is lessened. But, unhappily, the smooth surface introduces a far more than compensating measure of cruelty* from the absence of foothold afforded. Put into other words, the nature of the surface most favourable to the intermittent tractive action of horses is not that best adapted to purely rolling loads. To reconcile these conditions is impracticable; to approximate to a compromise is to diminish the efficiency of the one *pro rata* with increase of efficiency of the other. Thus we find ourselves on the horns of a dilemma in designing a road for mixed traffic.

The question then arises which of the two classes of traffic it would be the more prudent to provide for. If one considers the rapidity with which the horse, as a tractive engine, is being replaced by the automobile and motor-waggon, one cannot but feel in the case of a new city that streets should be designed for self-propelling traffic and motor haulage.

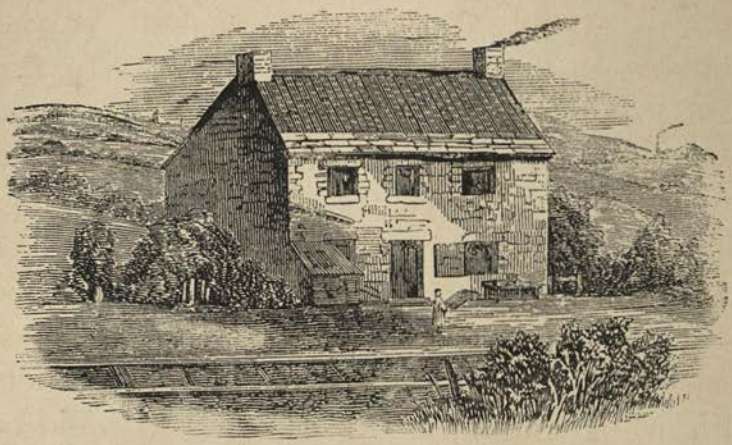
* The horses' shoes, moreover—those unscientific appendages to our horses' hoofs—appear particularly appropriate, not only to the production of the maximum of noise and inconvenience, but to the minimum of efficiency as regards ease of haulage. Nothing could be more thoroughly ill-adapted to the smooth and slippery surface of the streets of our large towns than these iron shoes. Their metallic surfaces are generally suffered to become as bright and smooth as looking-glasses, and upon these highly *glissant* foundations enlightened man expects our docile and long-suffering four-footed friends to exert the necessary tractive effort in the transportation of great weights.

With regard to self-propelling traffic, the problem to be solved is obvious—namely, to produce the most perfect rolling road surface with the minimum co-efficient of friction and the maximum of comfort. The great cruelty imposed upon the horse by the employment of the most perfect surface obtainable, viz., asphalt, has led to the adoption in towns of a compromise by the employment of wood pavement. This unfortunately falls far short of asphalt in its sanitary attributes. But that is not due to inherent defect, but is a consequence of a serious imperfection in horse-drawn traffic. The ideally perfect street surface would be one *absolutely non-absorbent.* Asphalt comes near to perfection in this regard, whilst wood-paving leaves very much to be desired. Excrement, liquefied by rain, is readily absorbed, and, in sunshine, is returned to the atmosphere in noxious effluvium and unhealthy exhalations. The unpleasantness and unsanitary condition of the thoroughfares of towns due to horse-drawn traffic has now assumed an acuteness demanding remedial measures. It is obvious that it is a serious disability under which we suffer which will remedy itself in course of time automatically upon the complete realization of horseless traffic. But the question to be considered is whether or not suitable measures can be taken at once. Three-fourths of the filth of town streets is undeodorized dung. When moist, this is most offensive and a menace to health; when dry, though less offensive, it is more dangerous to public health;

it then not only gives rise to inflammation and affections of the eyes, but it is drawn into the respiratory organs with serious effect.* I am informed that in Germany an antidote is frequently resorted to, in the form of a basket or bag affixed to the tailboard, by means of which the dung is intercepted and prevented from ever getting upon the street. Such a course is obviously a highly efficient preventative one — and all preventative measures are far more valuable than curative ones —and, I feel, commends itself for careful consideration. It, moreover, possesses the merit of being absolutely justifiable, and, if productive of inconvenience to the few, it would confer benefit upon the many. If it be not unreasonable to legislatively prohibit all 'visible emission' and other defilement of thoroughfares in the case of motor-propelled traffic, it were equally justifiable and reasonable to call for prohibition in the case of public damage caused by horse-drawn traffic. So serious is this shortcoming due to absorption, that it is found in towns that streets having high houses on either side, especially if they run east and west, cannot be paved with wood for the reason that they fail to dry up, and consequently wear and tear and cost of renewal is found to be excessive.

Therefore, in a new city, where it is to be assumed,

* It is stated that the health and length of life of scavengers is most unsatisfactory, and this perforce must be shared by the urban populace.



George Stephenson's Cottage at Wylam, where he developed his First Locomotive.

The First Passenger Locomotive—the 'Rocket.'

by the time development had proceeded to any great extent, self-propelling traffic would largely preponderate, it would appear that asphalt is the most suitable surface to be made use of. In the case of automobile traffic, with its elastic rubber tyres, the cost of maintenance would be reduced to a minimum, as also would be the cost of scavenging. On sanitary grounds, in the residential avenues and promenades, horse-drawn traffic might well be prohibited. With properly constructed roadways, such districts might well be looked upon as districts of health, whilst in another year or two it would be found that they were also districts of silence. For, with the rapid improvements now being made in internal combustion motors, coupled with universal employment of pneumatic tyres, it will be found that self-propelling traffic will become far less noisy than horse-drawn traffic, the excessive noise of which in some towns renders the carrying on of office work most difficult and wearying.

These remarks anent the desirability of hardness and smoothness of street surface naturally lead to comparison, and the drawing of analogy as between roads and rails. Rails—or trams,* as they were at first called—were originally put down—in the fight against friction—in connection with collieries, for the dual purpose of counteracting the softness of the

* The derivation of the word 'tram,' in this relation, has been the subject of disputation; but it is generally considered to be an abbreviation of the surname Outram.

land and of producing a *quasi* smooth surface.* Now, we have to consider the essential difference between a tramway and a railway in their popular significance. The essential difference—apart from the actual form of the rails used—is that in one case (the tramway) the smooth track follows the undulations of the earth surface, whilst 'railways' are constructed—by means of cuttings, tunnels, and viaducts—to afford as *level* a track as may be. Now, seeing that in towns the rails invariably lie directly upon the earth surface, and follow all rises and falls in the ground, it is at once apparent that, if the surface of the ground itself be made hard and smooth, the *raison d'être* for tramways at once disappears.

Hence, from the points of view of public hygiene as well as public convenience, the best mode of dealing with the problem of street locomotion is to produce a hard and smooth surface *over the whole ground surface, and to discard the use of rails of any sort.* Tram-rails in streets are a menace to public safety,† and the greatest possible public inconvenience, not only to every form of locomotion (except the rail constrained vehicles themselves), but also to all users of the thoroughfares, except those actually seated within the tramway-cars. The

* Trams were at first made of timber.

† The practice of watering the rails to reduce friction, for example, has been the cause of great loss of life, and should be prohibited.

blocking up of thoroughfares by the employment of great tramway-cars, to which I have referred, seriously reduces the carrying capacity of streets, and in newly-designed cities *tramways should be entirely prohibited.* The one exception should be the case of tramway lines forming part of a system of inter-communication between town and town; and in that case the streets should be made of sufficient width to permit of the cars being run in the centre of the thoroughfare over *ground exclusively reserved for them*, and not overrun by 'mixed' traffic.

If streets were designed and constructed in this manner for the passing through of town-to-town tram-cars, it is clear that the rate of travel would be much accelerated, to the great convenience of urban and suburban passengers.

This brings us to the consideration of a most important matter—the speed of urban traffic. In our large towns the mitigation of the waste of time and loss to commerce entailed in getting from one district to another has now become the most burning question of the hour. Tramways are popularly supposed to constitute a rapid means of personal transport in towns. This, however, is entirely erroneous. The average speed of travel of horse-cars may be taken at about seven miles per hour, whilst, in regard to electric tramways, it may be taken as not exceeding eleven or twelve miles per hour.* The figures

* The limit of speed imposed by the Board of Trade regulations varies according to circumstances, but may be taken at from fourteen to fifteen miles per hour.

given, however, are for considerable distances, including the suburbs; in denser traffic the average probably does not exceed seven miles per hour. Now, with well-designed streets and efficient control locomotion might well be carried on at twice this speed.* The witty saying of the injured Hibernian that it was not so much the rapid fall which had injured him as the sudden stoppage is, in a way, applicable to locomotion, both inter-mural and extra-mural. It is not that the speed is at fault: the trouble arises from the frequent stoppages. And yet it is not the stoppages which are *entirely* to blame, for the average speed of travel depends largely upon the rate of acceleration which can be attained after each stoppage, as well, also, as the speed of retardation which can be carried into effect before each stoppage. In other words, the speed of flow of traffic is very largely dependent upon the speed of 'pick-up,' coupled with the 'braking efficiency' of ordinary urban mixed vehicles.

Very slight reflection will serve to show that horse-drawn traffic is the principal offender in this regard. And in this connection I would like to take the opportunity of pointing out the in-

* The high speed of horse locomotion is usually overlooked. As a result of some careful timing observations made in Hyde Park, it has been found that horses drawing private vehicles frequently go at 13⅓ miles per hour, whilst the speed of the gondolier of London—the hansom cab—when not obstructed, has been found to be as high as 13½ miles per hour. Even 'four-wheelers' have been timed at 11⅔ miles an hour.

consistency and cruelty involved in calling upon the horse, not only to start his load, but to stop it. Many and varied have been the ingenious devices from time to time brought forward to relieve the horse of the severe strain thrown upon him during the starting of his load—and this is doubly important in regard to smooth surface streets—but all of these have entailed not only complexity, but added vehicular weight, so that none have come into practical use. With regard to breaking, however, there is really no excuse for the slowness with which brakes are being fitted to horse-drawn vehicles. Within the last year or two several useful regulations* have been enforced in regard to horse-drawn traffic, as, for example, the universal carrying of lights, and the provision of windows in covered vans. But I contend firmly that *it should be made compulsory* to fit efficient brakes to all four-wheeled vehicles.†

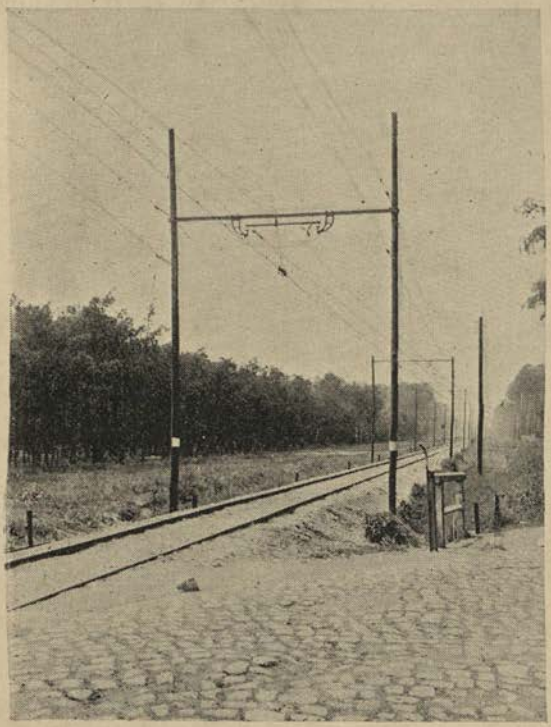
The point I wish to bring forward in this chapter, and to forcibly impress both in regard to urban and inter-urban traffic, is that the thing to be striven for is not increase of *maximum speed*, but increase of

* These are capable of improvement; for example, nothing could be more senseless than the regulation that all fast vehicles —motor-propelled—shall carry *tail* lights, whilst no provision whatever is made for slowly moving vehicles to be protected—and to protect the fleeter—in this regard.

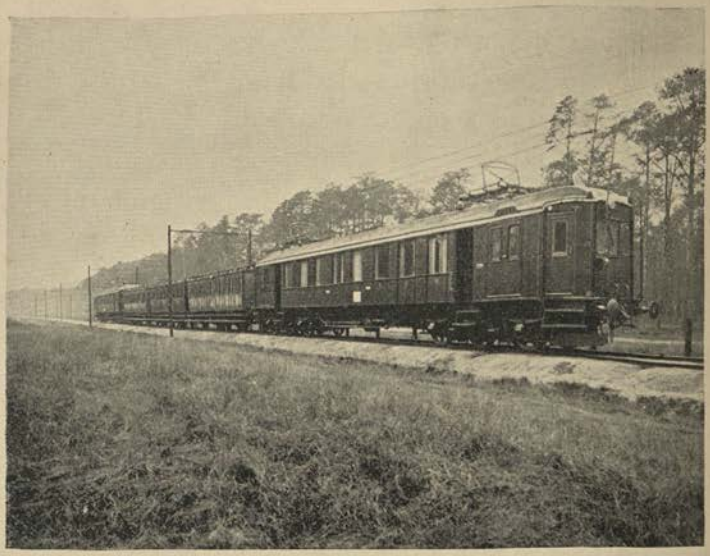
† The problem of designing an efficient brake for two-wheeled horse-drawn vehicles has not yet been solved.

average speed. Perhaps the best way to emphasize this will be to take in the first place the case of inter-urban communication.

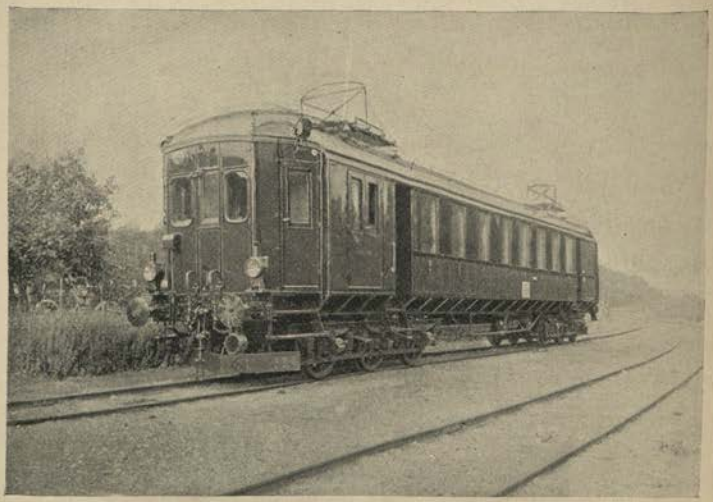
We will take the case of a railway. Now, it is clear that the most perfect system of inter-communication would be by means of fast trains serving the two towns forming the destinations, and no others. But a fast service is by no means synonymous with an efficient service. For the latter it must be both fast and frequent. This, of course, cannot be attained except between towns having very large populations. The case of a train filling up at the starting station, and emptying entirely at the terminal station, may be taken as representative of total efficiency. Directly, however, we commence to stop that train at intermediate stations, we observe the fall in efficiency. In the first place, the fully-loaded train is carrying the maximum live load with a minimum of dead load. Its mechanical efficiency is also at the maximum, for the whole energy developed by the engine is utilized in useful tractive effort. To put a heavy train into motion, and to accelerate that motion up to the maximum speed, necessitates a very large expenditure of horse-power. In the case of an express train this horse-power is expended once, and once only. In the case of a stopping train this expenditure of energy has to be repeated time after time—viz., after leaving every stopping station. It has therefore been pointed out that the ideal conditions for an express



An Electric Railroad in Germany over which Trains run at exceeding a Hundred Miles an Hour.



A German Electric Train which runs at a Speed exceeding a Hundred Miles per Hour.

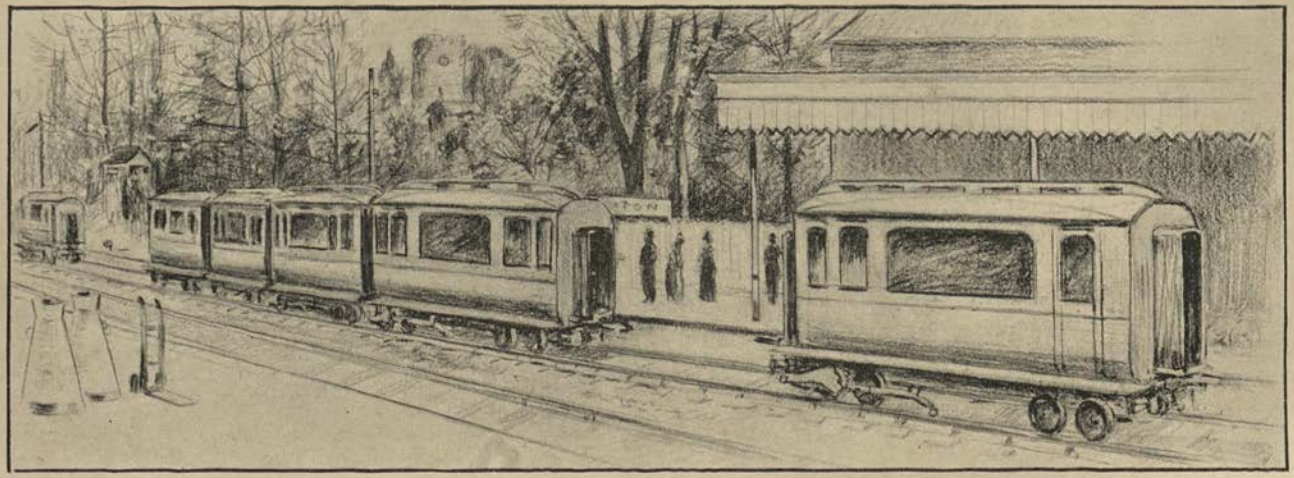


A German Electric Rail Coach which travels at upwards of a Hundred Miles per Hour.

and a stopping line are different. An ideal express line would be one absolutely level, whereas an ideal stopping line would be one in which each station was situated upon a hill. For it must be remembered that the whole of the large amount of energy put into the train whilst dragging it up to its top speed has to be taken out from it again—by means of the brakes—before it can be brought to rest. Now it is clear that if such energy could be stored up in the train considerable economy could be effected. It is also clear that such accumulation of energy takes place when a train runs up a hill. But in the case of intermediate stations being situated each upon the top of a hill the economy is twofold—both in horse-power and time—because on the train starting from the station it begins to descend a hill, in doing which the accumulated energy is re-exerted —*i.e.*, given back—and this, added to the power of the locomotive, enables a greatly increased 'pick-up' or ratio of acceleration to be obtained. Towns, however, are not so obligingly placed as to allow this principle to be carried into practice; but in constructing subterranean railways or 'twopenny tubes' the tunnels are usually raised and depressed in order to obtain this advantage. The useful efficiency in stopping and starting trains at intermediate stations is obviously also very much lower than in regard to terminal stations, for in the former case the whole dead weight of the train has to be stopped and started in order to set down or

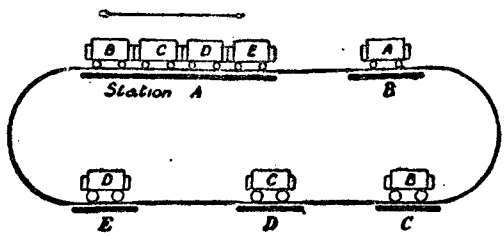
take up passengers, representing almost a negligible fraction of this total weight.

From the popular point of view, however, the efficiency of an inter-urban train service is its speed, and hence engineers have recently been turning their thoughts towards the realization of avoiding the delay involved in stopping trains at intermediate stations. The most perfectly thought-out scheme for attaining this end is the one devised by Mr. J. Brown, F.R.S., of Dunmurray, Belfast, who has kindly sent me particulars of his system, together with the illustration presented on the opposite page. In regard to rapid acceleration, the time-honoured steam locomotive leaves much to be desired. The reasons, however, are too technical to be touched upon here. Suffice it to say that the more modern form of railway locomotion—electrical propulsion—is far more satisfactory in this regard. Mr. Brown's system is applicable only to electric railways, and may be thus described: The coaches are of the corridor type, like the American vestibule cars—a system of construction now making rapid headway in Great Britain. Each is provided with its own electro-motor, placed beneath the under-carriage; therefore no locomotives, in the ordinary acceptation of the word, are made use of. For simplicity of explanation, let us take the case of a train consisting of four coaches, as shown in the illustration and also the diagram. This starts from station A. At the same time separate coaches are standing at



An 'All Stations Express' Electric Train.

stations B, C, D, E. As the train approaches station B, the coach A, which has loaded with passengers, is started by the driver in charge of it, and run with only sufficient speed to allow it to be overtaken between stations B and C by the train which has started from station A. In order to provide for safety in coupling up and dropping off the coaches, a protective signalling device has been worked out, but a description would be of too technical a nature for these pages. It may be explained, however, that a galvanometer, or in-



dicator, would be carried in each coach, and its dial would be graduated in distances upon which the hand would show the space of rail intervening between the two trains to be combined.

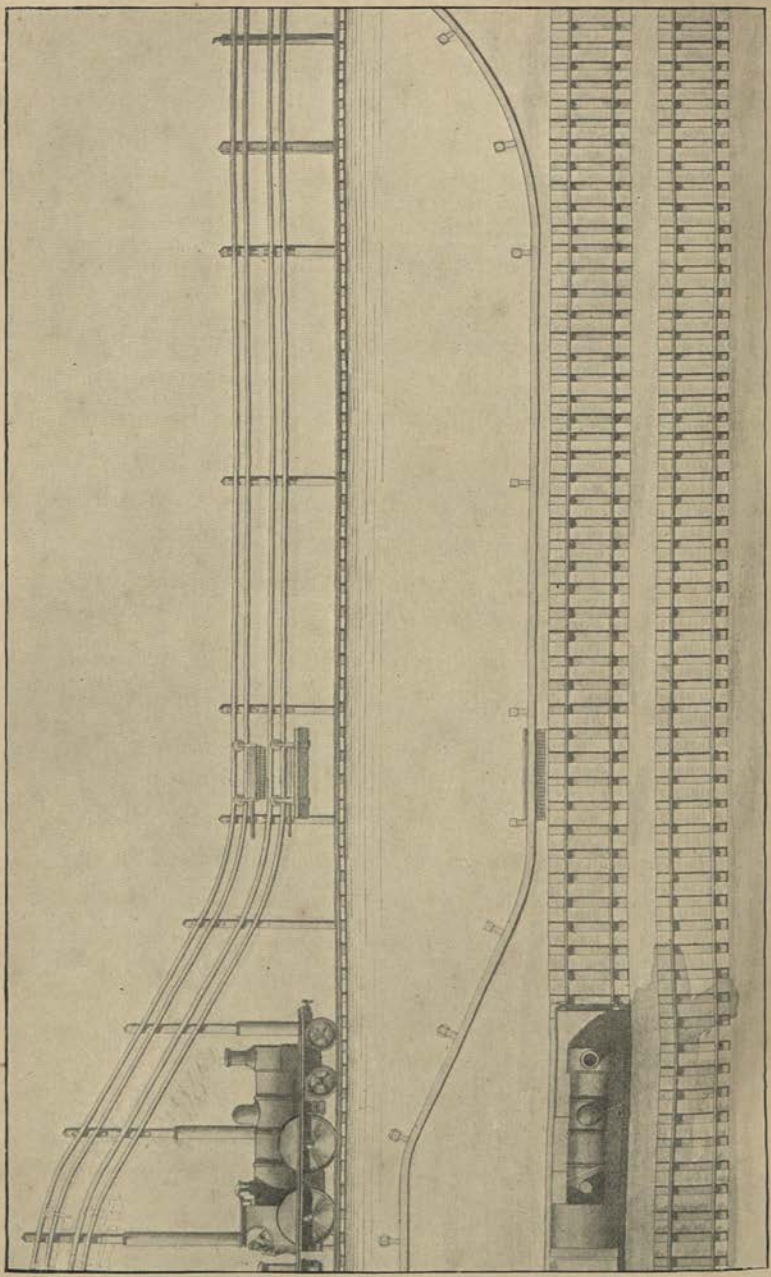
As soon as coach A had been added to the train, the driver of the train would go to its forward end and there take control of the electrical train, connection being made to all the other carriage motors for that purpose; or the driver of coach A would take charge of the train, and the former driver go to the rear coach ready to slip it.

In order to allow passengers for station B to

alight, the train, as it approaches B, slips its last coach marked B, which is then brought to a standstill at station B. The same process is repeated at each station. The result is a through express for every station. The passenger simply enters a carriage standing at the platform from which he departs. As soon as it is coupled to the train he looks (at his leisure) for the carriage marked for his destination, and remains there till the carriage stops, when he can alight with ease. Two or more coaches may be slipped or picked up, of course, if one be not enough. Although here shown as applied to an endless railway, the scheme is equally applicable to a railway with termini. It would be eminently suitable for the various underground electric railways recently proposed for London.

In concluding the description of his system, Mr. Brown mentions that it has been decided to put it into practical operation upon a newly projected line in Ireland, and, as becomes a witty Irishman, adds: 'This is the *railway scheme of the future!* and don't you forget it!' The delightful ambiguity always to be found peeping up in things Irish is not here wanting. Let us trust—seeing that inter-urban communication is a matter of great national import—that the future may replace 'scheme' by system; also that I may have fulfilled the injunction laid upon me.*

* The system was discussed and shown in operation by means of electrically-propelled models at the British Association meeting held in Belfast.



The Sennett System of Taking in and Discharging Mails from Trains in Motion.

The principles involved in Mr. Brown's scheme just described were embodied in a scheme of my own, submitted to the Postmaster-General as long ago as 1891, in response to his desire for 'an improvement in the apparatus in use for transferring mail-bags to and from the mail trains whilst in motion.' The essential in both cases is that two moving vehicles, each independent and moving with intrinsic speed, should be made temporarily to assume an actually equal speed and then be brought into contact. In Mr. Brown's system such contact would be made fore and aft, whilst in mine it would be made laterally. I will describe in a few words my system of 'receiving and delivering mails or passengers into, to or from trains in motion.'* It will be readily understood by reference to the accompanying illustrations that 'the essential principle of the improved apparatus consists in the fact that the mails are automatically received from, or discharged into, suitable receptacles which are travelling at the same speed as the sorting coaches. Apart from the automatic working, if it be so desired, not only mails, parcels, etc., but even persons may be transferred to or from the train without the least shock.' The mode of action of the mail apparatus is as follows: 'The postman at the wayside station deposits his mail-bags in the upper carrier (see illustration), and then raises both it and the lower carrier to the top of the incline. The attendant in the "sorting

* Submitted to the then Postmaster-General in April, 1891.

coach" places the mails in the hopper on the floor of his carriage and sets his hopper in the position shown in Fig. 1, at the same time extending two small levers some 24 inches from the side of the carriage. This may be done at any time the mails may be ready, and no more attention is needed. As the locomotive approaches it releases the carriage or cage-trucks, and these, running down the incline are overtaken by the sorting-coach upon the level portion of the little auxiliary railway, when the receiving mail hopper discharges into the sorting coach, as shown in Fig. 3. The concussion obviously will be very slight, and such as it is, may be reduced by the employment of the pneumatic cushion shown in Fig. 2. The sorting-coach having now engaged with the cage-trucks, they travel at the same speed as the train. The effect of this engagement by releasing a clutch is to allow the receiving mail-bags to slide gently into the hopper in the sorting-coach and conversely, the delivery mail-bags to slide gently into the cage-trucks. This is all done automatically and instantaneously, and if the auxiliary line be prolonged as may be required, any number of bags may be subsequently allowed to slide from the train into the cage-trucks. The operation of transference both to and from the coach having been completed, the train gradually disengages itself from the auxiliary train, which comes to rest by the mails being so arranged as to break it by friction.'

The reader will, I think, at once appreciate that

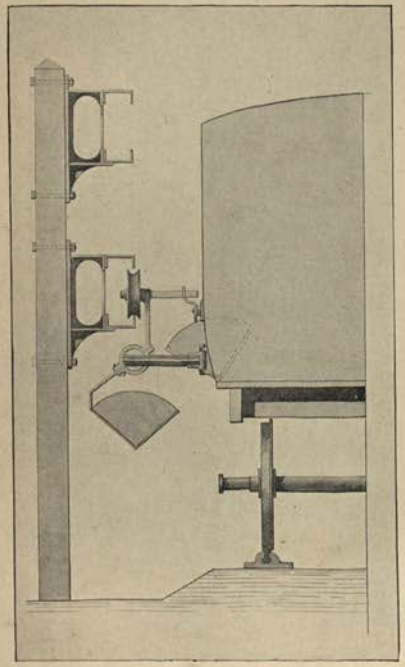


FIG. 1.

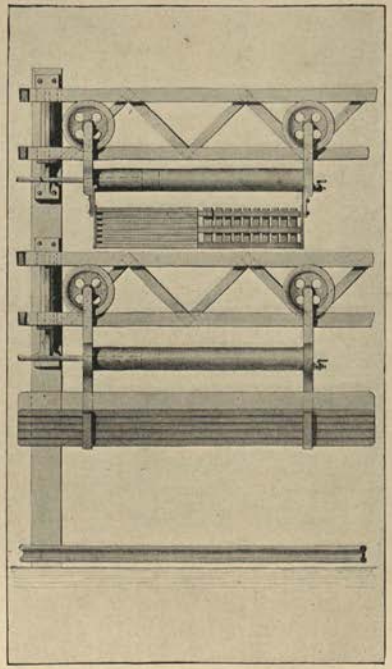


FIG. 2.

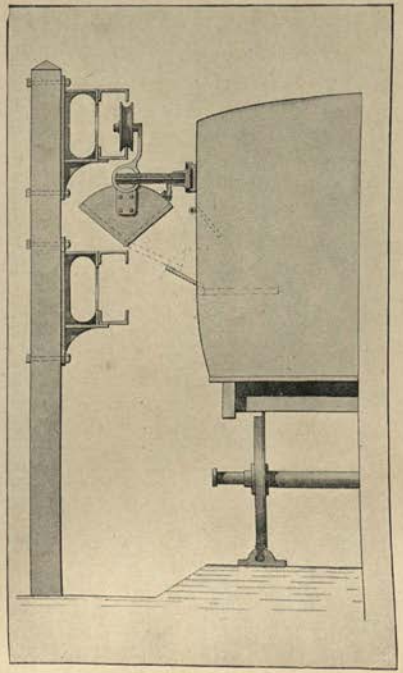


FIG. 3.

The Sennett System of Taking in and Discharging Mails from Trains in Motion.

the actual speed of going does not *per se* give rise to any difficulty in regard to the transference of material or passengers from trains in motion. Perhaps it would be rendered still more obvious by analogy with ships in motion. Suppose a liner desires to drop a pilot, or other passengers, and that the ship is travelling at ten knots an hour; whilst just in front of it is the pilot tug steaming at, say, nine or nine and a half knots per hour. It is clear that, when the liner shall have overhauled the tug, both the vessels will be travelling at practically the same speed. It is then only necessary to temporarily connect the tug to the liner by means of a hawser thrown over the side, to carry out the transference of any amount of goods, or passengers, from the liner to the tug, or, *vice versâ*, so long as the two vessels remain in contact. Precisely the same conditions obtain in the system I have advocated for the transference of the mails, with the one exception that, for the sake of safety the counterpart of the tug—namely, the little auxiliary mail train—would be made to travel somewhat faster than the express, so that as it slowed down the express would, in the most gradual manner possible, overtake it. The reader will have no difficulty in following this if he considers the case, which so often happens, of being seated in a through train travelling at a moderate speed and being overhauled by a local train travelling at a somewhat higher speed. As the engine of the local train gradually gains upon

us, we appreciate that it is travelling more quickly than ourselves; but, strangely enough, when the more quickly-moving train lies entirely alongside of us, and continues to gain upon us, the notion takes possession of our mind that we are ourselves travelling *backwards*, unless we happen to look out of the windows on the opposite side, and are thereby enabled to recall our movement in relation to the stationary landscape. When, however, the local train, on approaching the next station, begins to slacken speed, it appears to be quite stationary alongside of us, and we feel it would be quite as easy for us to open our door and step into the train alongside as it would be for us to open our door and step out on to the platform if our own train was at rest. When the brakes of the local train are applied, in order to bring it to rest at the platform, our impression is, not that that train is stopping, but that we ourselves have commenced to travel *more quickly.*

This analogy, I trust, will serve to impress upon the reader the fact that the transference of passengers between trains in motion is merely one of mechanical detail. And I would wish to be allowed to explain how my system would work as an 'all-stations express,' this for two reasons: firstly, because it is entirely different from that of my friend Mr. Brown; and secondly, because the bold idea involved in his system of trains travelling at high speed being made to overtake each other *end-to-end* is one which will naturally be met with a

considerable measure of nervousness on the part of the general public. In the Brown system, supposing, by any possible oversight, one of the trains standing at an intermediate station (say B) had not been started, especially upon a curve, and the indicators had not been carefully watched, it is obvious a serious collision would be possible. In the system I propose, however, any such mistake would have no effect, for the 'through' train would merely pass the standing train in the ordinary way.

To make the working of the system clear to the reader, let the case of an ordinary railway and ordinary rolling-stock be taken. Within the last year or two it has been found necessary for all lines running into London to build additional 'roads,' in order to keep those used by the expresses quite distinct from those upon which the suburban traffic is run. The number of passengers continually entering and leaving our large towns is almost incredible. Therefore the reader can picture to himself in each case four lines of metals running into a great town, say London, with a succession of trains upon them, those running upon the two medial roads being '*fast*' trains, whilst those running upon the two outside roads are '*stopping trains*.' Now, the problem is to provide an express service to the intermediate stations without delaying and interfering with the through expresses. Imagine, now, that the local trains, except when leaving stations and slowing down to stop at them, travelled at the same speed

as the through trains. Now, it is clear that transference of passengers from the expresses to the local trains could, by suitable mechanical means, be effected at all portions of the line at which the trains would be running at the same speed. At that time, and *only at that time*, would the contact-making devices be allowed to project, and then only when the guard in charge of the local train had observed that the speeds of the two trains were identical. In all other cases the trains would pass each other without any connection, as at present obtains.

So much concerning inter-urban personal transport and means of expediting it. I will conclude the remarks I have to make concerning locomotion, urban and inter-urban, by a reference to the carrying out of the principle of 'never stopping' in urban personal transport. In doing so, it gives me pleasure to feel that I am complying with a promise made to Professor John Perry, F.R.S., from whom I have in the past received valuable tuition, in bringing to the notice of the reader a mode of locomotion not yet seen in this country, but which has been put into operation elsewhere, and may be destined to play an important part in urban locomotion in the future. I refer to *travelling pathways*. '*Trottoir mobile*' is the somewhat modest term applied to the system, but I shall hope to show that modification and extension of the principle could be made to revolutionize urban locomotion.

To the French must be ascribed the invention

of this strange and valuable means of expediting personal transport in towns, and of saving fatigue in walking from place to place. I have endeavoured, in this chapter, to emphasize the value of continuous motion, and the great defect under which all existing forms of mechanical locomotion labour by reason of the necessity for the stoppage of the vehicle, of whatever form it may be. To the Americans is due the credit of having devised the means of furnishing towns with footways which can be in continuous motion, and hence all loss of time and—what is almost as important from the financial standpoint—the great expense from wear and tear due to incessant startings and stoppages is entirely obviated. In this relation, without entering into any engineering details, I may say that the economy in the propulsive effort—that is to say, the amount of horse-power required for a moving footway over vehicles which stop and start to receive and discharge their passengers—is very considerable. This point has been impressed upon me by Professor Perry, who had occasion to make careful tests, in this regard, of the elevated travelling footway which ran throughout the Paris Exhibition of 1900. In the first suggestion for a travelling pathway—said to have been brought forward by Mons. Hénard about 1889—which was to have a speed of 5 kilometres an hour (say, 3 miles per hour), the whole fabric was to be

brought to rest for fifteen seconds out of each minute to enable the passengers to join and leave it. The effect of this—leaving out of consideration running expense disadvantages—it is obvious, would have been a loss of one-quarter upon the average speed, which would thus have become reduced to little more than 2 miles per hour.

Such a system, consisting, as it really did, of an endless system of railway waggons, to be stopped and started as Mons. Hénard suggested, did not, in my opinion, constitute such an innovation upon the many systems of mechanical rail transport—perhaps more numerous in France than anywhere else—as to carry upon its face the elements of successful application. A far more ingenious system appears to have been invented some time previously to this suggestion which Mons. Hénard brought forward as a proposal for a novel mode of locomotion to be used by the visitors to the Paris Exhibition of 1889.

The inventor of the ingenious system upon which development has been wrought was Mons. Dalifol, and this he patented in 1880. His patent referred to a new system of transport, consisting of a moving platform driven by a stationary motor, and appears to have been the first recorded scheme embodying the principle involved. Mons. Dalifol's railway consisted of a staging placed at a convenient height above the ground; of a fixed platform to which passengers ascended; and of a movable platform

upon which they travelled. The latter formed the moving pathway, and was built up of a number of short lengths to facilitate its turning round curves, each length, indeed, being mounted upon a small truck of its own. These trucks were carried upon wheels furnished with rubber-covered tyres, in order to insure quietness in running, the whole being mounted upon fixed rollers. Such appears to have been the original of the movable pathway, the question being one of interest now that this means of transport has become developed from a fantastic idea to a practical system of locomotion.

Eight years later a Mons. Blot obtained a patent for a moving pathway actuated by means of friction wheels working on fixed pulleys, this being the principle subsequently worked out and made use of with such success in Paris. The essential principle, however, which I must now refer to—viz., means for obviating the necessity of stopping the motion of the pathway—did not occur to Mons. Blot, so that his system, together with those preceding, laboured under the same disadvantages as an ordinary tramway car does, in so far as it was necessary to stop and start the platform for the taking on and discharging of passengers; for in his system also it was not intended that the movement should be continuous, but, on the contrary, stops were to be made every two minutes. This obviously was a great disadvantage, not only in regard to the expenditure of motive power, but also because

passengers could not ascend and descend, except at points corresponding to these 'two-minute' intervals.

The problem of how to obviate the necessity of stopping this snake-like vehicle or continuous foot-path was attacked by Messrs. Silsbee and Schmidt, two American engineers; they solved it in a very simple manner, and upon that system known in engineering as the principle of differentiation. Their system consisted of employing, in place of a stationary pathway constructed alongside of a moving pathway, a stationary pathway in combination with a *duplex moving pathway*, the speed of its moving parts being differentiated, so that that portion nearest the fixed portion of the pathway travelled at only half the speed of that portion furnished with seating accommodation. This will be clearly understood by reference to the illustration. In this, the lady will be seen stepping off from the stationary portion of the pathway and on to that having the lower speed. To take her seat she has only to step again on to the further portion, which is travelling at twice the speed of that upon which she first stands. To facilitate the getting on and off, the first or slower platform is provided with a number of posts that can be laid hold of during the transference. The operation, however, is quite a simple one, for numerous experiments carried out by Messrs. Silsbee and Schmidt established the fact that anybody, no

matter how *gauche*, could step from a stationary pathway on to a platform moving at a speed of 5 kilometres ($3\frac{1}{10}$ miles) an hour, this probably arising from the fact that that is the speed of a person walking at a moderate or ordinary pace.

The principle having now, I trust, been made clear, it is easy to see that by simply stepping from one platform to another our bodies can be made to obtain any desired speed of transport, and it may here be interesting to mention that upon the travelling platform shown in the illustration, which was set up in Jackson Park, Chicago, and kept running continuously for two months, effecting during that period the transportation of more than 10,000 people of both sexes and all ages, *not a single accident took place.* It may here be mentioned that the difference in level between the two parts scarcely exceeded 2 inches. In this case, the portion upon which the lady is stepping moved at 4 kilometres (say $2\frac{1}{2}$ miles) an hour, whilst the seats travelled at 8 kilometres (say 5 miles) an hour.

I must not touch upon constructional details, but will just mention that obtaining the two speeds of running entails practically no complication in the gear of the motive mechanism ; all that has to be done is to cause the quicker-moving platform to roll upon rollers having twice the diameter of those of the slower-moving portion. To those who

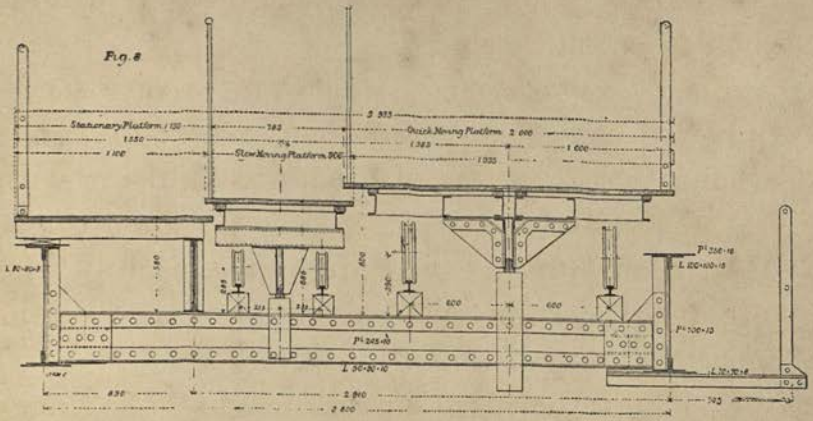
understand such things the skeleton diagrams should make this clear.

The '*Trottoir mobile*,' which ran so very successfully and carried so many thousands of passengers around the large area of ground comprising within it the Exhibition of 1900, was the joint work of MM. Blot, Guyenet, and Mocomble, each of whom introduced certain refinements into their various departments.

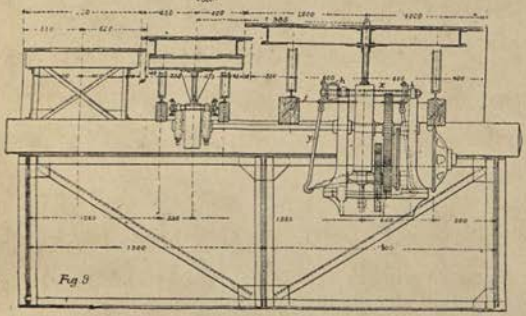
It might, perhaps, at first sight, be thought that the speed of about 5 miles per hour of the pathway would be no great thing in facilitating passenger locomotion in the streets of towns. If, however, one carefully reflects upon the effect of incessant stoppages, it will be found that *quite a moderate sustained speed is capable of transportation in a less time than a comparatively high speed subject to the usual intermittences.**

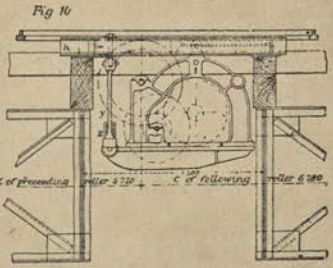
Valuable though this system is, at the present moment its utility, in my opinion, would be immensely enhanced by the employment of a triplex instead of a duplex rolling pathway. In that case we should be able to transport our bodies by the mere stepping upon a platform, sluggishly progressing at a speed of 2·48 miles (4 kilometres) an hour, and crossing two others, each of which would

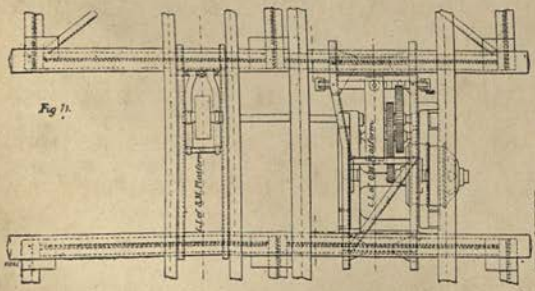
* In the case of tramways intended to have a minimum speed of 15 miles per hour, frequent stoppages may reduce this to an effective speed of only 10 miles per hour.

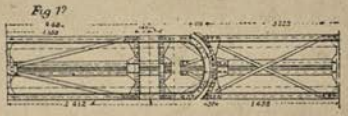


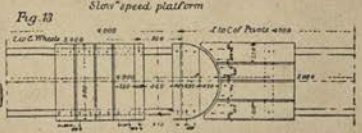
Cross-section of Duplex Rolling Pathway.





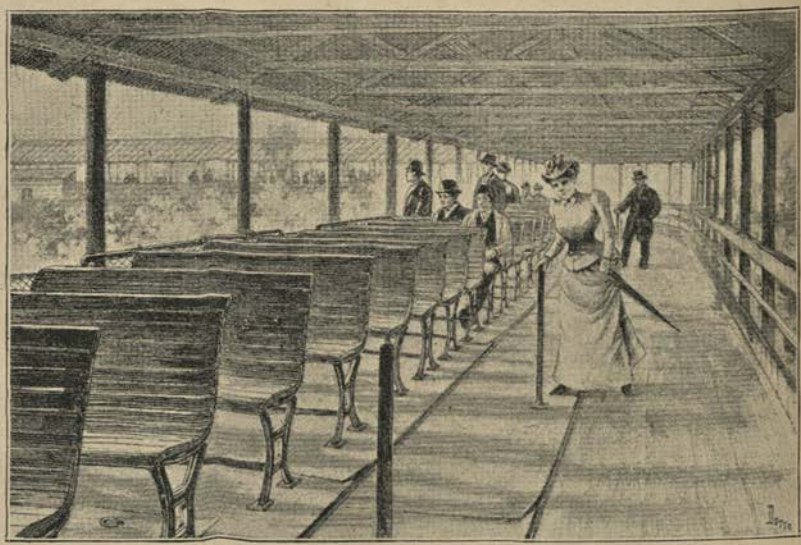






Mechanical Details of a Rolling Footpath.

Triplex Overhead Electric Travelling Footway and Seats.



Duplex Travelling Pathway and Seats.

only be travelling at the same increment of speed —*i.e.*, walking pace—to our seats at a speed of 7·45 miles (12 kilometres). A more convenient speed, however, would appear to be 3 miles per hour for the first pathway, as we find that, walking at an ordinary pace, one does not, so to speak, have to wait for the pathway to catch one up. Upon this assumption, it will be seen, the travelling seats would run at a speed of 9 miles an hour. Obviously, also, if in place of three moving platforms we employed four, the speed would be again increased, and would by this means attain 12 miles an hour. It is by no means necessary to construct these travelling pathways upon a viaduct; nevertheless, this is a very convenient method, highly economical from the point of view of street area, because it is obvious that by its means the effective street surface is immensely increased. Hence the proposal has been made to install elevated moving pathways in some American towns, in the manner shown in the illustration, where, it will be observed, the four-speed travelling pathway is shown, the speed of the seats in that case being about 20 kilometres—12½ (12·4) miles—per hour. The great utility of such a system will be appreciated when I say that it has been computed that more than 30,000 passengers per hour could be by this means expeditiously transported from point to point in a city.

It may perhaps be urged that the great convenience of such a system would in part be neutralized by the necessity of walking upstairs to the elevated pathway. Science, however, is ever followed by its practical applications, so that we find, since the production of moving pathways, moving staircases have made their appearance, and are to be seen and used in many large shops in New York, Paris, and London. Such a system embodying enclosed seats, the quadruplex system of differentiation, with its high speed, in combination with electric 'stairways,' would prove a most valuable system of locomotion in a new city.

To exemplify this perhaps one could not do better than to refer to the facilities such a system could confer upon the vast influx and exodus of business men into and from our great towns which takes place daily. The huge number of persons who daily enter by railway such towns as Glasgow, Manchester, and London is so surprising that statistics concerning this vast diurnal personal transport are frequently quoted, and I will therefore not touch upon its magnitude here. What we have to consider is whether the principle involved in the present method of suburban railway service is the most efficient and economical which could be resorted to. This will best be done by way of analogy, and for this purpose I will take the case of a suburban railway known to most people—namely, the one serving the southern suburbs and running from Victoria to

Ludgate Hill. The length of this line is 7 miles, and this distance is scheduled to be accomplished in the average time of thirty-two minutes, equivalent to a speed of about 13 miles per hour. Experience, however, shows that during the busiest hours—viz., those when business men are being conveyed—it is the exception to accomplish the journey in the scheduled time—the modest speed referred to. The disadvantage of intermittent transport becomes apparent when we reflect that this speed is only obtainable in the event of the passenger arriving at the particular minute when the train is timed to start. I must not here dilate upon the mental strain and deterioration induced by the daily necessity of catching trains at stated times, a matter in regard to which medical men have not failed to point out the seriousness. Assuming the passenger to wait five minutes, it is clear that the average speed at which his journey is made falls at once to $11\frac{1}{3}$ miles per hour; a ten-minutes wait brings the speed down to 10 miles an hour. On the line we are now considering there are run during the twelve hours from 8 a.m. to 8 p.m. thirty-eight trains, with an average lapse between each of about eighteen minutes. Supposing a passenger 'to just miss the train,' the speed with which the journey is accomplished is then only $8\frac{1}{2}$ miles per hour, assuming the trains to be punctual, a habit not characteristic of London suburban trains. I have mentioned that the speed of the travelling platform would be 12 miles per hour. The distance,

therefore, from Victoria to Ludgate Hill would be accomplished in thirty-five minutes, being but three minutes longer than the average speed of the railway trains. One of the many and serious disabilities under which business men domiciled in the suburbs labour is that they are debarred from walking to and from their places of business. With the rolling footway, however, they could walk to business if they choose, and in so doing would perform the *quasi* pedestrial journey—strange as it may appear—at a much higher rate of speed than can now be done by means of railway trains. Even seated in the saloons or upon the deck, it is obvious that, the motion being continuous and there being no delays upon the line and no time lost by the necessity of conforming to scheduled times of departure, the speed would be considerably greater, with the additional advantage that the traveller could arrive at his destination at exactly the time he desired, and not as nearly to it as the fixed railway times might enable him to approximate to his requirements. Perhaps the most remarkable feature of the travelling platform is its enormous carrying capacity—a feature which would entirely obviate overcrowding. It might, indeed, be viewed in the light of a continuous railway train, consisting of saloons alternating with 'garden seats.' Taking the saloons to be 20 feet each in length, they would accommodate twenty-six passengers, whilst on the 20 feet of deck intervening between the coaches there would be open-air seats for eighteen persons—

that is to say, every 40 feet of the platform would accommodate forty-four people, whilst every mile could convey 5,808 passengers, or over forty thousand persons (40,568) during the journey of 7 miles; therefore, travelling at a speed of 12 miles per hour, the carrying capacity would be *nearly seventy thousand passengers per hour*, these being all provided with seating accommodation, whereas under present conditions, during the busy hours, nearly one-half of the passengers have to stand. Under present conditions, an overcrowded train of ten coaches affords seating for 440 passengers and standing room for five more in each compartment; the utmost carrying capacity being 660. Now, with the service at present in existence under two thousand passengers (1,890) are carried per hour. But if we confine ourselves, as we should do, to the seating capacity only, then the maximum carrying capacity is but 1,320 persons per hour, or only 16,720 passengers during the whole of the twelve hours under consideration.

From this it will be seen that under the normal conditions of working in each case the railway service —utilizing the present rails to their maximum capacity—can only transport *a fraction—less indeed than one-fiftieth* ($\frac{1}{53}$ part)—of the number of passengers the rolling footway could convey. Even with the overcrowding referred to, which has become not only a serious disability under which business men suffer to-day, but a disgrace to our present method, the continuous system would be capable of conveying

thirty-five times the number of passengers the present railway service is able to do. Put into other words, the travelling platform—which could be conveniently carried upon columns and in a similar manner to that shown in the illustration, and would not necessitate the purchase of a single additional yard of land—*could convey each hour the same number of passengers at a higher average intrinsic speed than the present railway can do in a day and a half.* Not only would this be the case, but the cost of construction would be but a mere fraction of the cost of railway construction, whilst, as Professor Perry has pointed out, the running expenses would be exceedingly small. The tractive effort or horse-power required for its propulsion would be not only small, but economically produced. The great cost entailed in railway signalling would be entirely obviated, and, whilst collisions would be impossible, the trains would travel as quickly in foggy weather as in clear, and hence the serious disorganization of business due to fogs formed in large towns would in large measure be neutralized.

A comparison between the travelling platform and London's latest means of locomotion—the Central London Electric Railway—is equally interesting. This 'twopenny tube,' extending from the Bank to Shepherd's Bush, is $5\frac{3}{4}$ miles long. The journey is accomplished in twenty-five minutes, giving an average speed of 13·8 miles an hour. The individual train capacity is 336 persons, seated in

seven coaches, thus making its maximum capacity (with a three-minutes service) 6,720 passengers per hour. This, it will be observed, is but one-tenth of the capacity of the travelling footway. The average speed of personal transport of the twopenny tube is also considerably less when the loss of time in descending and ascending the lifts is taken into consideration. A similar calculation made in regard to the Inner Circle of the Metropolitan Railway, which is 13 miles in length, the trains taking one hour and ten minutes in completing the round, and stopping at twenty-six intermediate stations, shows that a circular travelling platform would seat and convey as many passengers in one hour as the Metropolitan Railway with its present service of trains is capable of carrying in twenty-nine hours.

It has always occasioned me the greatest surprise that the expedient of running trains on this and similar lines, and stopping them only at alternate stations, has never been resorted to. One sees from the above-quoted figures the great loss of time entailed by stopping at so many stations. Despite the fact that the trains are stopped and started with the least possible loss of time, the delay is found in practice to amount to about one minute per station. Now, these stoppages, therefore, amount to *rather more than one-third of the total time* occupied upon the journey. It is obvious, therefore, that if the trains were stopped at alternate stations thirteen minutes would be saved upon each journey. At first

sight it might be thought that a disadvantage would arise from the fact that the interval between the arrival of the trains at any one station would be double what it is at present. But this is not so. For if we take the case of a three-minutes service, the longest possible wait—*i.e.*, the case of a passenger so unfortunate as to see his train leaving the station—is six minutes; even in that circumstance a traveller having to wait the maximum possible length of time would still save seven minutes by means of the alternating system I advocate. The average duration of waiting would, of course, be only three minutes; thus the acceleration would be ten minutes per journey. But, then, these important points must not be overlooked: firstly, that by alternating the stoppages a greater number of trains could be run in the hour; and, secondly, which is most important from the point of view of both the directors and the shareholders, the accelerated service could be run much more economically. The wear and tear, it is obvious, of locomotives and rolling stock would be reduced to about one-half, whilst the consumption of fuel would be reduced by about one-third.

I have dealt at some length with travelling pathways, because I think they would better fulfil the requirements of a Garden City than any system of tramways,* if it be thought that some system of extraneously propelled locomotion were really

* If tramways *are* to be made use of, then it is best that they should be carried out and administered by the municipality.

necessary. I feel, however, reflection would serve to show that the inhabitants of a Garden City, restricted as to its inhabitants to the number I have taken by way of example, would be far better served by self-contained self-propelling vehicles than by any system of urban locomotion actuated from a central station. Services of self-propelling vehicles could be provided in such cities with far less capital expenditure; could be exactly proportioned to the needs of the city, commencing, indeed, with a single vehicle if thought desirable; could be increased *pari passu* with increase in the population; and could also—an important point—be made to yield a profit from the very first. For example, at first motor omnibuses, to carry, say, thirty-two passengers, could be run, and these could utilize, not only the street surfaces which had been made up, but the county roads existent.

Quite apart from the disfigurement, damage to street surface, and danger to vehicular traffic, a

Among other reasons, their control would remain in the hands of the bodies seized with the management of the roads, as also would the policing of the traffic. The joint and simultaneous repairs of the tramway overrun portion of roadways, and the side margins can be better arranged for and conflict of many forms avoided, whilst the comfort and convenience of the public, as well as their safety, can be watched over by a single authority, and with freedom from friction. For this purpose, in the case of inter-urban tramways passing through towns, the permanent way should be laid by the Corporation and leased to the company having the running powers, at a price to cover the cost of repairs.

tramway system can never approach in urban public convenience the capabilities of a service carried out by means of self-contained vehicles. A tramway system—unless its cost be entirely disproportionate—can only serve the principal thoroughfares of a town, whereas the number of *routes* which may be taken by self-propelling vehicles is entirely unlimited. Financially also in Garden Cities tramways would stand at great disadvantage, because it is obvious that their proportionate cost would increase with the sparseness of population, and in far more serious ratio than the increase in length of frontage per dwelling. Not only the cost of installation, but the money-taking capacity of a tramway system, must, of course, vary with the density of population.* Consequently, if a tram-

* In connection with the installation of tramways in Garden Cities, Mr. Raworth—Chairman of a number of successful tramway companies—has kindly directed my attention to a means of dealing with the factor of sparseness of population, and rendering a *frequent* service remunerative by the expedient of employing what has been termed the 'Demi-car' system. It may be interesting to point out that, as so often happens, this is an instance of one invention growing out of another. A system—too technical to touch upon here—known as the 'regenerative control,' was devised, as he points out, 'to reduce the ruinous cost of "Corporation electricity" on lines having severe gradients.' When this system was got into operation, it was found that the driver had been thereby relieved of 'nine-tenths of his work.' Whereupon one of the Board of Trade Inspectors facetiously remarked: 'Now you must invent something to keep the driver awake.' The suggestion became embodied in 'the one-man car.'

The 'One-man' Electric Tramcar.

way system were installed, not only would it be a losing concern for a time, but it would be necessary, in order to permit of cheap fares being charged, to

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Upon this car, which is shown in the illustration, the driver not only drives, but looks after the passengers and takes their fares, becoming, in fact, both driver and conductor. The car itself is only half the weight of an ordinary car, and requires only half the energy to drive it; in fact, all the working expenses are divided by two. By its use, lines which at present can support only a twenty minutes' service can support a ten minutes' service of Demi-cars, and take more than double money; in other instances, a ten minutes' service can be raised to five minutes. The design and construction of the car is peculiar. The enclosed body provides seating accommodation for fourteen passengers, and there are two external smoking compartments, with three seats and standing room for six. The passengers enter at the front, instead of the back, and on the left-hand side of the driver, the rear entrance being closed and the step turned up. Ingenious provision is made for the safety of the passengers, the pay-gate being so coupled to the electric controller that the car *cannot be started* until the gate has been closed; in case of necessity, a passenger may lift the gate and stop the car. In consideration of these provisions for the safety of the public, the Board of Trade has approved the car. The Demi-car is, indeed, the safest of all cars, because the passengers enter under the eye of the driver, and the pay-gate makes the starting of the car impossible until the passenger is safely inside.

It is anticipated that the advent of the 'Demi-car' will give a great impetus to the development of electric tramways, for in the first place it will improve dividends, and thereby increase the confidence of investors, and in the second place it will make electric tramways possible in districts which, under existing conditions, could not support them. The illustration shows a Demi-car in use at Southport. Its consumption of energy is

construct it in the least expensive manner possible; and this would mean that the overhead system of conduction would have to be resorted to. Now, I contend that the hideous ugliness of overhead electric tramways should in itself suffice to render them taboo in any town in which it was thought to stimulate æsthetic feeling, or in which it was hoped to attain to any degree of architectural beauty. The overhead contact system is an abomination, not only by reason of its unsightliness, but of the incessant annoyance caused by the hissing sound produced by such contact. Even in regard to cost, it is clear that this is not all in favour of the hideous system; for although prime cost is decidedly upon its side,

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0·28 units per mile, whereas the large cars of the same company take 0·56, similar electro-motors being used in both.

There are many lines in this country which pay only 2 or 3 per cent., and there is not sufficient traffic to support an efficient service. Let us take the case of a line earning 6d. per car mile, the working expenses of which are 5d.; the net profit is 1d. Now, if Demi-cars be substituted, we get this result: Takings 6d., expenses 2½d., profit 3½d. Thus the net result is improved at least three times. On an ordinarily good tramway the takings average 11d., and the expenses about 5½d.; but there are certain times of the day, usually in the forenoon, and in some districts two or three days a week, when the takings do not exceed 4d. a mile; therefore, on every journey under such conditions, there is a loss of 1d. a mile, which has to be made good out of the profits earned at other times. In such cases 'Demi-cars' would convert the loss of 1d. into a profit of 1½d., the financial position becoming therefore 2½d. better.

yet the annual outgoings in compensation for accidents may go far to counterbalance this. It is, indeed, a matter of sheer luck whether or not the sums paid in compensation may not equal or exceed the sum representative of interest of money upon the increase in cost of an underground system. In most towns where the overhead system has been adopted both human and animal electrocution has occurred, whilst the aerial 'live' wires are a source of danger in connection with the running of fire-escapes, as well as in regard to the falling of telephone wires, a so frequent occurrence in winter.

Although one must be an out-and-out progressive to be able to sympathize with the rash expenditure incurred by the London County Council in many ways, one cannot but hold them justified in having incurred the additional expense in adopting the underground system of tramways for London.

My personal view is that in small towns, especially those of sparse population, the time has gone by for the installation of a system of locomotion requiring power to be supplied to it extraneously, as, for example, from a central station. If, however, this view be not taken, then certainly careful consideration should be given to such extraneously driven systems as do not entail the laying down of tram-rails. I feel I ought, therefore, to refer to the system of Mons. Lombard Gerin which many readers might have seen in operation in the Parc de Vincennes in connection with the Paris Exhibi-

tion of 1900. It is in practical operation at Lyons, and also at Fontainebleau. The system adopted by Mons. Lombard Gerin consists in the employment of steerable omnibuses, deriving their electric energy from a pair of trolley wires carried by short brackets, projecting from lamp standards, or other posts situated along one side of the road. On these wires runs a little two-wheeled trolley containing a small electric motor for its own propulsion, the whole being connected to the omnibus by a flexible cable attached to a pole on the roof, devices being also provided to keep the cable sufficiently taut and to obviate any risk of derailing the trolley. Continuous current at 500 volts is supplied to the omnibus motor *viâ* the trolley wheels and flexible cable, which also contains the small conductors serving to convey back to the trolley-motor the three phase current which drives it and causes it to always travel slightly in advance of the omnibus. The omnibuses weigh about three tons empty and five tons loaded, and their wheels are furnished with solid rubber tyres. At ordinary speeds the power required to propel them is from 130 to 160 watt-hours per ton-mile on level roads.

If we assume that, instead of incurring enormous expenditure in an extensive tramway system, such expenditure had been devoted—in a Garden City—to the production of perfect street surface throughout its length and breadth, one at once appreciates the great advantages the inhabitants would reap, and

the house-to-house convenience obtainable from an efficient service of self-propelling omnibuses as opposed to a tramway system.

Of vital importance to the commercial prosperity of the city is a well-thought-out system of rapid and frequent parcels delivery. Reflection will show that such a system of rapid, thorough, and frequent parcels delivery could be very easily and economically carried out in co-operation with an efficient system of motor omnibuses. Space will not permit of my describing in detail a system I have in my mind in this connection. Suffice it here to say that a certain number of the mechanically propelled omnibuses would have attached to them at the back, by a quickly detachable coupling, a light *trailing vehicle* for carrying parcels. This vehicle would be provided with pedals, so that on being detached from the omnibus, it could be pedalled in the same manner as tradesmen's carts are now so commonly propelled. The city would be divided up into a number of small parcels-delivery districts, and each district would have its own collection and delivery office in the form of a small kiosk, situated at a prominent street corner of such district. To each of these offices would be attached a couple of these little velocipedic trailers, one of which would be engaged in collecting parcels, whilst the other, on arrival of the motor-omnibus, would be detached and immediately sent on its round of delivery. Each trailer would carry conspicuously the number of its

district, whilst every parcel as received would be numbered conspicuously with the number of the district in which its destination would be found. The parcels thus numbered would be sorted in the kiosk, and placed in the trailer bearing a corresponding district number as it passed the kiosk. With such a system it is easy to see that even in a large town parcels could be collected, transported and delivered, in from thirty minutes to an hour.

With such a system, moreover, the tradesmen of a city could be saved in the aggregate an enormous sum per annum; for it would not be necessary for them to keep up any kind of delivery vehicles. A large staff of drivers and messengers could be dispensed with, together with hundreds of horses and private delivery vehicles, as also a vast amount of stabling and numerous coach-houses, whilst the tradesmen would be entirely relieved of the cost of upkeep of the vehicles. The present system of calling round for orders entails a vast expenditure of quite uselessly employed energy—not only on the part of tradesmen, but also on the part of domestics. In a well-ordered city all orders would be given by telephone, whilst the goods received by this system would be received within an hour in any part of the city, a feat which could not be performed by the tradesmen themselves were they to employ ten or twenty times as many delivery carts as are at present needed by them. For it is obvious that private delivery carts could not be making their way to more than one

district of a town at one time; whereas, with the system I propose, the goods could be travelling in all directions at the same time. In the case of trade parcels the collecting trailer would be called by telephone, and such would usually be the case in regard to private houses—in Stockholm, for example, every house and shop, no matter how small, has its telephone—but in the case when the latter had no telephone parcels could be sent from house to house by being placed in a trailer by the consignor, on payment of 1d. to the conductor in addition to the parcels rate.

I am anxious to impress upon the reader that the conditions obtaining in regard to cities of the nature we are discussing as concerns urban locomotion are entirely different to those of great cities and large towns. In a town of restricted population, whatever the system of urban locomotion, its primary use and object would be to provide convenient personal transport from one part of the city to another. In an overgrown town the conditions are quite otherwise; for in regard to them the primary use and object of mechanical locomotion is to provide access as between the centre of the city and its suburbs. In the one case it is a pure matter of locomotion, whilst in the other it is an inseparable link in the housing problem. In this connection a somewhat elaborate scheme has been suggested by Captain Petavel, R.E., for providing the inhabitants of great and densely-populated towns with *free* suburban railway travel by the

expedient of the Corporation purchasing the surrounding districts at agricultural value, establishing factories on such belts and providing the fares out of the increment in value of such land upon becoming suburbanized. I venture to suggest, however, that the purchase of agricultural land further removed and the erection thereon of Garden Cities would prove a far more practical and efficient antidote to overcrowding. This was well put by Mr. Balfour in the House of Commons in May, 1900. After having recalled the fact that it was on his motion, as a private member, in 1884 that the Royal Commission on Housing was appointed, he went on to say:

'I am quite sure that the remedy for the great disease of overcrowding is not to be found in dealings, however drastic, with insanitary areas. The number of overcrowded people in London who live in insanitary areas I believe to be relatively small. The truth is, it is a question simply of time and space, and nothing else. If you can accommodate, by raising the height of your buildings, a larger population on a given area, well and good. But if you cannot do that, then you must go outside the narrow area at the centre of your congested district, and you must trust to modern inventions and modern improvements in locomotion for abolishing time. For my own part, it is in that direction that I look to see the solution of the problem. I think it can only be solved in the case of the working classes, as it has been solved in the case of the merchant and the clerk, by a great augmentation in the number, and a great increase in the cheapness of our methods of conveyance from one place to another. Let us give to municipalities all the powers they require to use the inventions of science . . . and turn them to the best account. I believe myself that we are on the eve of an immense reform, of an immense augmentation of the means of communication. I

believe that electrical traction and other forms of traction are going to play a far larger part in the solution of this difficulty than any of the strange schemes which I have analysed.'

I draw the reader's attention to this speech because in the four years which have elapsed since the Prime Minister gave utterance to his prescient views his prognostications have become fulfilled in a manner such as no similar period can show. I refer to it also to draw attention to the fact that as towns continue to grow the congestion of traffic in their streets must become intensified, not only in proportion to their own growth, but in much more rapidly increasing ratio—namely, in proportion to the increase of suburban area coupled with increase in influx due to extension of inter-urban communication. I contend, therefore, that the unwarrantable blocking up of urban thoroughfares by huge tramway-cars and the impeding of one class of traffic by another—the hampering and dislocation of the great mass of mixed traffic by unsteerable rail-constrained vehicles—can prove but a temporary measure. Mr. Balfour's suggestion of connecting the centres of great cities by wide thoroughfares reserved exclusively for high-speed motor-propelled and velocipedic locomotion is an excellent one—one which all would wish to see carried into effect.

To restore the efficiency of thoroughfares after the introduction of tramways widening of thoroughfares becomes a necessity, and the cost of such widening is colossal. Yet, nevertheless, from the above con-

siderations, it is clear something must speedily be done. Mr. Charles Booth, F.R.S., who has so intently studied the subject of housing, says: 'A new measure has to be applied to time and space in city life. Perhaps it is because city life is singularly behindhand in this respect that it suffers such congestion to-day. In all other departments of life the methods of communication have been quickened nearly tenfold, and increased a hundredfold in the nineteenth century. But in city life the past hangs round us, and has made progress very slow. Let anyone now design a city of four or five million inhabitants, and how greatly it would differ in plan and structure from London!'

It is certainly an anomaly that whereas railway companies are continually spending millions in the widening of their roads and increasing their carrying capacities, the arteries of circulation of the towns they serve remain very much of the same carrying capacity. To widen urban thoroughfares to fit them to the requirements of to-day and for the immediate future is a work so colossal as to approach that of rebuilding a city. The question, then, is, What is best to be done?*

* Not only is the cost of easing traffic colossal, but loss through congestion is enormous also. In a report 'on the improvement of the sanitary condition of the labouring population,' written as long ago as 1849, the following interesting passage occurs, bearing directly upon the subject we are now treating: 'As an example of the coincidence of pecuniary economy with enlarged sanitary

I contend that the terrestrial surface is not the proper place whereon to lay tramway rails, and I have dwelt at some length upon the inefficiency in carrying on a system of traffic brought about by the necessity of frequent stoppages in such traffic. And I say that in overcrowded towns, street surface should be left quite free for the exclusive use of mixed and steerable traffic. Where it is necessary to carry tramways through such congested thoroughfares such tramways should be carried above the street surface, and not allowed in any way to interfere with the traffic carried on therein. I have dwelt upon the economy in working, both in time and motive power, of 'never-stopping' systems of mechanical transport, and also upon the great facility offered for taking advantage of such mechanical transport even for short distances and without the necessity of joining or alighting at fixed points, which is rendered possible by means of moving pathways.

For the very congested thoroughfares of densely-populated towns the mode of locomotion depicted

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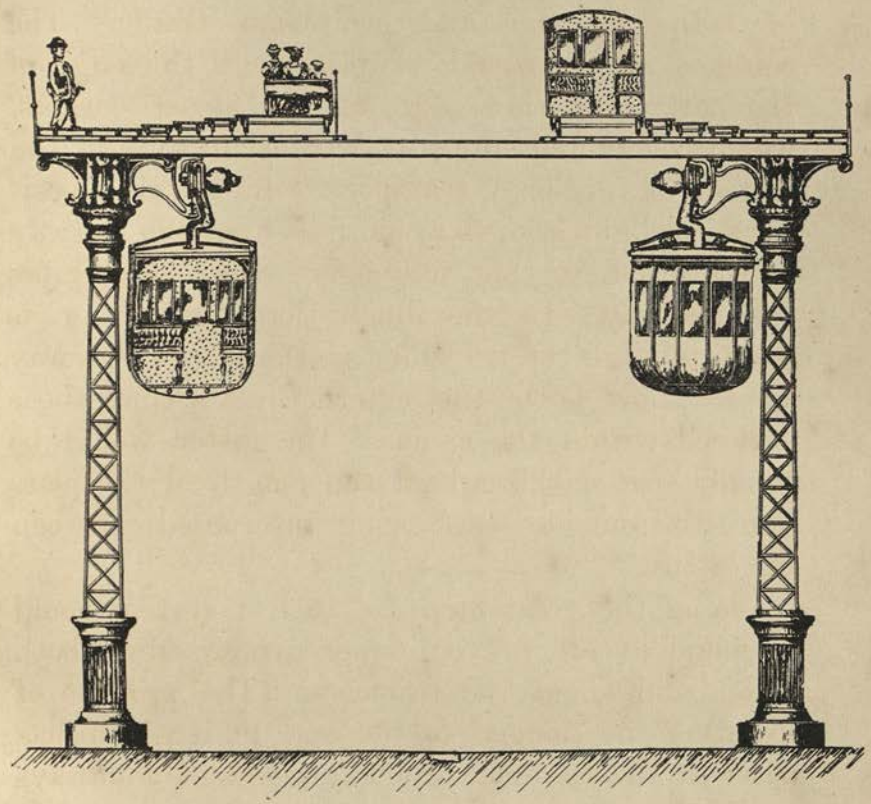
measures, it may be mentioned that it is shown in a report on a survey made for sanitary purposes by Mr. Butler Williams, of the College of Civil Engineers, Putney, that a loss of not less than £80,000 per annum is now incurred in carriage traffic alone, in two main lines of streets, namely, Holborn Hill to the Bank, and Ludgate Hill to the same point, being made crooked and with steep acclivities, instead of straight and level, as Sir Christopher Wren designed them.' (This, of course, was before the construction of Holborn Viaduct.)

in the illustration would prove the most efficient.* This, it will be observed, is a combination of travelling footways with an aerial tramway system, an arrangement which would relieve the congestion of both vehicular and pedestrian traffic. The columns shown would be placed at the edge of the pathways, where also, at the street corners, would be situated staircases leading up to both the systems of personal transport. In suitable positions also light bridges would pass from one footway to the other, so that passengers need never cross the roadway. In the illustration the section is taken through the travelling platform in such a way as to show both the external seats and those enclosed within the cabins. The latter would be equally spaced throughout the length of the platform, the outside seats being interposed between the cabins.

One of the great merits of such a system would be found in the prevention of overcrowding both within and about the tramcars. The problem of obviating the danger to life and limb which has arisen at the terminal stopping-places of tramways serving large towns is a serious matter, which, although it has received most solicitous consideration by engineers, has not yet been solved. One

* 'What I am anxious people should bear in mind is that trams, railways, and "tubes" by no means exhaust the catalogue of possible improvements in transit.'—The Prime Minister, February 12, 1901.



Combined Travelling Pathways and Aërial Tramways for Densely Populated Towns.

has only to visit such tramway termini of the Metropolis as those at Westminster and Blackfriars to become impressed with the urgent necessity for a prompt solution. The only efficient method known of dealing with such crushing is the mode recently introduced from the Continent, and known as the *queue* system. But it has been found impossible to resort to this mode of preventing disorderly scenes in connection with the loading of tramway-cars on the surface of the streets, because it is quite impracticable to set apart the requisite space, which, moreover, would be of little avail, since—apart from the crushing—the danger lies in the necessity of leaving the footway and crowding into the roadway, in face of the ordinary vehicular traffic. With an overhead system, however, it will at once be seen that the provision of a light gallery whereon the *queue* may form at once solves the difficulty.

In the case of an inter-urban system of tramways*

* I have had more than once to draw attention to the grave inconveniences and losses arising from want of standardization. The great engineer I. K. Brunel was, unfortunately, in the zenith of his fame at an epoch a little too late to enable him to confer upon us the great benefits which would have accrued from the general adaptation of his 'broad gauge' system of laying railroads, which for a number of years was in use upon the Great Western Railway. As things are, the queer measurement, 4 feet 8½ inches—said to have been obtained haphazard by measuring the width apart of the wheels of an ordinary farm waggon—has become the standard gauge for Great Britain. It might have been thought that the great intercommunication

passing through the thoroughfare, these would rise by a gradient on entering the confines of the city, and run upon the top of the girders, as shown.

Not only would the cost of installing a system such as that depicted in the illustration be far less than that of disagreeable and unhealthy subterranean tunnels, but a city could be equipped with such a system in a fraction of the time necessary for the excavation of tunnelling.

The matter of efficient inter-urban road locomotion is a subject of national importance. The mercantile value of roads to a nation is very great. As I have already mentioned, our roads have not received the attention their importance merits; but it is interesting to note that in the early thirties of last century

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inconveniences which arose out of the existence of the two railway gauges, ending, moreover, in the eventual taking up of the broader, might have pointed a sufficiently potent object lesson to have prevented a reinstatement of multiple gauges. It is therefore both surprising and disheartening to find that the tramways of Great Britain have been laid down with no less than nine different gauges—the more disheartening when one glances at these, and observes that in some instances they differ only by ¼ inch, and even ⅛ inch. We have 3 feet, 3 feet 6 inches, 4 feet, 4 feet 7½ inches (Scotland); 4 feet 7⅝ inches, 4 feet 7¾ inches, 4 feet 8 inches, 4 feet 8½ inches (standard); 5 feet 3 inches (Ireland). I have also had occasion (under 'Municipality') to refer to the rapid extension out of bounds, and the linking up of one town with another. A glance at the above figures will convey some idea of the magnitude of public inconvenience and wasteful expenditure the future has in store, due to such want of foresight.

great improvement was taking place, especially in regard to trunk roads. The rapid introduction of railways, however, effectively checked such improvement, and from that date until the present it has been felt that roads had assumed secondary importance. Now, however, upon the introduction of self-propelling traffic inter-urban routes are commencing to present a busy spectacle, and the old and nearly deserted hostelries are again being requisitioned by those who travel by road, and their value has greatly enhanced. Road congestion, especially on entering and leaving towns, is already keenly felt, and it is appreciated that much remains to be done by way of improvement in our arteries of personal and mercantile circulation. The matter is a gigantic and difficult one, and at present suffers principally from that British shortcoming, want of systematization, and in this case central control. The maintenance of our roads remains entirely in the hands of the local authorities. It may be urged that the same obtains in regard to the police, to education, and the administration of the Poor Law; but it must not be forgotten that in each of these cases there exists a central authority, whose duty it is to watch the working of these departments *as a whole*, and to keep that of the local authorities up to a certain standard of efficiency. Inter-urban communication upon the Continent is better than with us, and the highways far superior. They also present a uniformity unknown to us. The routes of communication are

divided into three classes, according to their importance, and each is kept up to a predetermined standard. This is due to the fact that the administration is vested in a central authority invested with permanent power and control. In France the duty devolves upon the Department of Ponts et Chaussées. The roads of Belgium, Italy, etc., are also under State control. It is such a system of State control which Great Britain is lacking in regard to this important matter.

At this epoch, without doubt, we should be the better for a Minister of Ways and Communications. The fact that the control lies with local authorities not only prevents the realization of uniformity, both as to construction and maintenance, but it presents immense difficulties in regard to concerted action. In this regard we may well say with Carlyle, 'Roads are many, authentic finger-posts are few.' Such a finger-post has now happily been set up by the formation of the Roads Improvement Association, the inauguration and working of which has been so largely due to the persevering energy of Mr. Rees Jeffreys, now one of the hard-working secretaries of the Automobile Club. In collaboration with this important organization an Advisory Committee of Civil Engineers has been appointed, upon which I have the honour of serving, and it may be not without value here to append the resolutions passed by the experts as a result of their primary deliberations :

(1) That a central department should be established to determine the direction and control the construction of new trunk roads.

(2) That the central authority shall exercise control over existing trunk roads, and shall have power to determine their width and the frontage lines of buildings on such roads, provided always that no new building shall be erected within 50 feet of the centre of a trunk road, and the Local Authority shall pay suitable compensation for unoccupied land within the existing fences.

(3) That a short Bill be introduced into the House of Commons, providing for the minimum width of all existing trunk roads, as set out in the foregoing resolution, and preventing any further encroachments on roadside wastes.

(4) That the Prime Minister be asked to receive a deputation with reference to trunk-road construction, and that suitable questions and notices of motion with reference to the matter be placed upon the Order Paper of the House of Commons.*

No one has evinced a more intelligent and more practical appreciation of the work with which this association has to deal than the present Prime Minister, and it is therefore sincerely to be hoped, in the interests of our nation, that, aided by suitable legislature, and, let us hope, the establishment of a Ministry of Ways and Communications, we may be enabled to make up, not only efficient highways of inter-urban communication, but much of the ground lost through our previous neglect.

The subject of the improvement of the trunk roads of Great Britain—seeing they lack the thoroughness and system the central responsibility

* Resolutions adopted by the Advisory Committee of Civil Engineers, May 18, 1904.

and control adopted in France and elsewhere has brought about—is a matter of difficulty commensurate with its importance; hence it cannot too soon be entered upon. The general reader may not have had occasion to become impressed with the vast national importance of highways. They, however, represent a factor of the greatest moment in relation to the economics of production. Just as a good, cheap, and rapid system of transport—both personal and merchandise—is of vital importance to the prosperity of individual towns, so is a complete and well-considered system of highways, connecting the towns, of the greatest importance in regard to national prosperity. Our railway system of late years has been vastly improved, not so much by reason of increase in mileage as through improved intercommunication; and now, with the advent—or, rather, recrudescence—of self-propelling vehicles for common roads, it is of the greatest import that intercommunication by means of common-road arteries between our industrial centres should receive most serious attention, the more so from the fact that our railway companies are at the present moment evincing laudable enterprise in regard to such common-road, inter-urban communication by means of motor omnibuses and self-propelling, heavy-haulage vehicles.

APPENDIX I. TO CHAPTER VII.

EVOLUTION IN MODES OF TRAVEL.*

'Those projects which abridge distance have done most for the civilization and happiness of our species.'—MACAULAY.

'Mark me, ere long we shall see a pan of coals brought to use in place of a feed of oats.'—BISHOP BERKELEY (about 1740).

AMID the bustle and hurry necessitated by the exigencies of modern life, we seldom pause to consider the origin of anything. If we did, we could scarcely find a more interesting and instructive subject than the study of the gradual development and evolution of locomotion; and, further, if we consider that advances in travel and transport form nothing less than the index to national advance, we are at once impressed with the great importance of road locomotion, be it personal or material.

The highways of the ancients were undoubtedly the natural watercourses of their countries, and, therefore, we are prepared to learn that ancient cities were invariably founded upon the banks of rivers and streams. When modern science teaches us how great an expenditure of energy is necessary for the carriage of a load by road, as compared with the transport of a given weight by water, we at once appreciate that the ancients, in doing that which was simplest, did at the same time that which was most scientific. The throwing of a log upon a stream, and the transport of one's person or chattels upon the log, formed a

* From the 'Introductory to the Official Catalogue of the International Horse and Horseless Carriage and Roads Locomotion Exhibition, 1896,' by the Hon. Executive Commissioner, A. R. Sennett, A.M.Inst.C.E.

mode of transport beset with but few difficulties, whilst the terrestrial transport of that same log offered to the ancients a problem which cost them many centuries of thought and development prior to its satisfactory accomplishment. This is but natural, when we consider that to carry out the former mode of transport man had but to imitate, whereas to effect the latter he had to invent—a cerebral process which did not make its appearance for many centuries after the faculty of reasoning by analogy had become general.

The first idea of land locomotion was the simple process of dragging, and thus we find that the herculean tasks successfully accomplished by the ancient Egyptians in the transport of material were entirely effected by this primitive mode. In carrying out their purpose, the Egyptians seem never to have been hampered by want of motive power, their invariable practice being to attach by means of ropes as many animal locomotives, in the shape of slaves, directed by cruel and unfeeling task-masters, as could be possibly attached to the weight to be dragged. In performing their tasks the Egyptians had to contend with a factor against which we, in our highly-developed condition of mechanical science, are still ever waging war—friction.

We to-day are striving to minimize friction in order to reduce the work of that noble and obedient animal motor, the horse—an approach towards whose perfection the most *habile* engineer and the most profound scientist will ever fail to attain—by devising mechanical means, some of them exhibiting great ingenuity, as, for example, the employment of ball-bearings upon horse-drawn vehicles; whilst our Egyptian prototypes strove to reduce friction of a grosser type—that between their heavy loads and Mother Earth. The mural inscriptions of ancient Egypt, which year by year teach us more and more of the conditions obtaining in regard to road locomotion some 4,000 or 5,000 years since, show us that the first device resorted to by the ancients was the employment of a liquid lubricant, a device continued with good results to the present day.

Perhaps the most interesting reproduction of these graphic mural inscriptions is that representing the transport of the colossal image of Prince Ghothotpû, wherein it is shown that no less than 166 slaves were attached to the sledge upon which the image was securely strapped. We are told by learned Egyptologists that water was poured by slaves—one of whom is seen standing upon the forward portion of the sledge—upon the road, for the purpose of reducing the enormous waste of energy by friction. From the less romantic and more prosaic point of view of an engineer, we beg to differ from this description, for it is clear that Egyptian science had passed beyond the stage of watering roads to ease the work done in road transport. On closer inspection it is perfectly clear, firstly, that the liquid used was oil, and, secondly, that it was not poured upon the roadway at all. The transport of heavy weights by the Egyptians was, indeed, precisely analogous to the modern launching of a large steamship. The sledge conveying the weight to be transported was supported upon timber logs or 'ways'; upon these 'ways' the lubricant was poured, and upon the mural diagrams slaves will be observed busily employed in carrying these 'ways' upon their shoulders from the rear to the front of the load as it progressed. Next to the actual dragging of the load upon the surface of the earth, this is perhaps the most crude mode of transport of which we have reliable evidence.

We, with others, have sought in vain for authenticated information regarding the invention of the wheel. We can, however, trace the first steps towards the development of the wheel by Egyptian mural records; for there we find the sledges were sometimes supported by rollers, the rollers of that time being nothing more nor less than the prostrate trunk of a tree, a thin slice of which constituted the primitive wheel. It must be remembered that the wheel of the ancients did *not* revolve round its axle-tree, as does the modern wheel, for the primitive axle was square, and firmly mortised into solid wheels, which, at a much later date, the Romans appropriately termed *Tympana*, or Drums. It is, however, to be assumed that the wheel was known

before the time of the Egyptians, but of this, apart from Biblical references, we have no direct evidence.

Turning to personal transport upon roads, we have little difficulty in finding which was the most primitive method. It was simply the one now only resorted to for the delight of our children, and known under the cognomen of 'Flying Angel,' or 'Pick-a-back.' This mode, in fact, is at present still in vogue in Mexico and other lesser civilized countries. This form of carriage, decidedly lacking in dignity, subsequently developed into the slave or man-borne litter, by which means persons of high degree were wont to be transported upon the shoulders of slaves. For some centuries, then, the only means of travelling from place to place, apart from that useful animal known as 'Shanks's pony,' was the carriage of one person upon the shoulders of others; and this did not mark any great advance in the evolution of transport.

We now come to a most startling innovation, which has not only lasted down to our day, but has attained to proportions of enormous magnitude. Having utilized each other as animals of burden, men conceived the idea of taming the more powerful and physically better adapted beasts of the field to the performance of material transport. The date at which the horse was first utilized as a beast of burden is wrapt in obscurity. We know, however, that this noble creature was not the first animal to come under the subjugation of man. The ass was, doubtless, by long years his predecessor in this useful service, and this again was not until after he and his companion, the bull, had long been pressed into the service of man for draught purposes.

The first useful employment of animals by man was doubtless the thrashing of corn, which was effected by the crude process of employing them to trample it under foot; next that of their employment as draught animals in connection with the plough; then in heavy haulage of material, more especially that used in agriculture. The horse was known as a draught beast centuries before he was ever ridden, and it is interesting and noteworthy that the Egyptians, who possessed well-trained horses, which

they used in great numbers in connection with their war chariots, held the horse in such high respect and esteem that they did not consider it consistent with his nobility to ride him; and we know of but one solitary record of an Egyptian saddle-horse. The ass seems to have been a creature holding lower place in the social scale, as he was ridden much in the same fashion as he is to-day by those of the lower order. Those of patrician order, however, considered it undignified to ride one ass, and consequently they allowed themselves to be transported sitting upon a board strapped to the backs of two asses walking abreast.

Of the horse-drawn vehicles of the Egyptians not much can be said, seeing that they were all of one type—that found to be most suited to warlike purposes, consisting as they did of an extremely light two-wheeled car, closed in front and open at the back for the ready entrance and exit of the warrior, and invariably drawn by two horses, supporting a pole by means of a yoke resting upon the withers. In regard to this, it is interesting to note that for many centuries any kind of vehicle drawn by one horse was entirely unknown; indeed, it was not until the latter years of the Roman Empire that a pair of shafts made its appearance—namely, in the two-wheeled vehicle called by the Romans *cisium*—and which, whilst being of considerable interest as the hackney carriage and the mail-cart of those times, is without doubt the progenitor of our own gig.

Coming to more modern times, we find the stereotyped form of the war chariot becoming developed into a number of different types. Four-wheeled vehicles of any kind were almost unknown with the Egyptians, but we find them in several forms among the Romans. Two-wheeled vehicles were previously open to many disadvantages, and it may be wondered why, then, four-wheeled types were not made use of. The answer is as simple as it is interesting—namely, that both the Egyptians and the earlier Romans found it beyond the scope of their ingenuity to invent any efficient means of 'locking,' or, in other words, of providing four-wheeled carriages with an independent fore-

carriage, such as is now put upon modern vehicles of the most meagre type.

When we consider that the ordinary four-wheeled conveyances of the Romans consisted of nothing more than a huge, weighty wooden platform, resting directly upon a cumbrous timber—and appropriately called 'axle-tree'—from which it was prevented from parting company merely by the insertion of four wooden pegs projecting from the under side of this platform, and that the wheels were solidly affixed to and revolved with the axle-tree, so that to turn the vehicle was a matter of the greatest difficulty, and could only be effected by performing a tremendous circle, or by lifting the vehicle bodily into a new direction, we shall at once appreciate that travel could not have been very expeditious with four-wheelers, and that the work performed by the oxen or other draught animals could not have appeared to them 'all beer and skittles.' However, time, which provides most things, at length provided the fore-carriage; and many and ingenious are the speculations as to how this came to pass, perhaps the most probable and interesting being the suggestion that the pole of one chariot may by accident have rested upon the floor of another standing in front of it, and that the facility experienced in drawing the second may have suggested to the ancients the idea of the perch-pin or fore-carriage. Be this as it may, the Roman vehicles came during later years to be locking contrivances, and capable of turning round within a reasonable distance. The time-honoured fore-carriage is apparently likely to disappear, the system of turning adopted upon horseless carriages possessing several advantages.

The use of wheeled vehicles among the Romans rapidly increased, and their increasing numbers caused such great inconvenience that their employment came to be entirely prohibited within the cities. The ladies seem to a large extent to have been the culprits, for it would appear that the Roman ladies' idea of the importance of being in the fashion was quite as keen as that of our own fair sisters. Before wheeled vehicles became general, ladies took to making their calls and promenades by means of

slave-borne litters to such an extent that the streets of Rome became congested with beauty borne shoulder-high, and in time the Emperor had to put a stop to it, and restrict the luxury to invalids. The same happened when wheeled contrivances became the rage with them, and the use of these in their turn had also to be restricted. The fact that wheeled vehicles came to be employed for the personal transport of affluent Romans gave birth to that profession or industry now known as 'coach-building.'

So great was the rivalry among Romans regarding the elegance and splendour of appointments of both their carriages and harness, and so keenly did the patricians vie with each other in disporting 'turn-outs' of surprising ornateness and elegance, that the baser metals used in their construction began to get discarded—silver and gold were lavishly employed; nor did they stop at this, for we know that many of their equipages were richly beset with gems and jewels.

At the date of the fall of the Roman Empire, coach-building, which had then attained to great perfection, and had become an industry of great magnitude, received a most serious check, if not temporary annihilation.

We then find it necessary to skip over some centuries, and to turn to Germany and Spain, and at a later date Flanders and France, for a resuscitation of the industry. There we find coaches being gradually produced under a very different garb, the lightness and elegance of the ornate Roman carriages being absent in the medieval ones, and in their stead weight and clumsiness were predominant. Some, however, of the German and Spanish carriages of the Middle Ages, we should not forget to state, were highly ornate.

During all this time that little spot upon the earth's crust known as Great Britain knew not of a single carriage, if we except the 'fighting chariots' of the Britons, and at a later date those brought in by the Romans. This for a very good reason, for, even had we possessed the carriages, we did not possess roads to run them upon. It is a matter for the greatest possible

surprise that our nation, which we are to-day proud to feel leads the world in the production of carriages, as well as having undoubtedly attained to the greatest advance in civilization, was so extremely slow to avail itself of the advantages of roads—nay, more, to fulfil a glaring and daily-felt necessity. Even when the carriage—or coach as it was invariably termed in those days—did make its appearance, it could only be used within towns. So late as 1555, the year in which it is stated, upon the authority of Stow, that the first covered carriage was built in this country—for, says he: 'This yeare Walter Rippon made a coach for the Earle of Rutland, which was the first coach which ever was made in England'—we did not possess any roads worthy the name. This coach was subsequently presented to Good Queen Bess, and thereby the fashion of ladies travelling upon wheels was established.

In these days travelling in any kind of vehicle was looked upon with suspicion, those indulging in it being characterized as effeminate. In this relation the pluck, hardihood, and robust constitution of the British ladies stands out in pleasing and striking contrast to that of their indolent, luxury-loving sisters of Southern Italy. Our fair ladies preferred to adhere to the mode of travelling afforded by the horse, which they in those days bestrode in man-like fashion—the side-saddle not being introduced for centuries later, and for which we are, it is said, indebted to Anne of Bohemia.

In connection with the transition of the horse from an animal of burthen to an animal of draught, it is of great interest to note that the views held by our ancestors of medieval England were the exact reverse of those of the Egyptians. The ancients felt that by being ridden this noble creature suffered degradation, whilst our ancestors felt that it was highly derogatory to his nobility to cause him to drag anything. Whilst the Roman ladies were trundled at a slow pace upon wheels over the hard and unyielding stones of the magnificent Roman roads, our 'knights and faire ladyes' galloped across the soft swards of our verdant isles, enjoying health and freedom, the counterpart of

which could perhaps alone be found in the freedom of action and soundness of wind and limb of the noble steeds which bore them.

Wheeled vehicles, however, gradually made headway in towns, but for long years the stalwart legs of the then prevailing type of horse proved by far the more appropriate mode of transit over —or shall we say through?—the deplorable roads. It is really surprising when we reflect that it was not until about the year 1661 that the first stage-coach was put upon the road; but even at that date one could hardly be said to travel upon wheels, since it was frequently necessary to dismount and to wade knee-deep through slush and mire, the while being frequently called upon to assist in the propulsion of the coach for considerable portions of its journey. Indeed, for years after their installation, on many routes coaches could only travel during summer. Their speed even then was by no means calculated to supply medical practitioners with any novel form of disease, such as came afterwards to be predicted when it was suggested to run railway trains at the startling and unnatural speed of twelve miles per hour.

As late as 1754 we find the merchants of Manchester putting on a 'flying coach,' and stating in their notice 'that, however incredible it may appear, this coach will actually, barring accidents, arrive in London in four days and a half after leaving Manchester.' 'Such swift travelling was considered dangerous as well as wonderful,' said the Lord Chancellor; 'and I was gravely advised to stay a day in York on my journey between Edinburgh and London, as several passengers who had gone through without stopping had died of apoplexy from the rapidity of the motion.' We find, for example, that the Edinburgh coach in 1763 took no less than from twelve to fourteen days to accomplish its journey between the Scotch and English capitals. Short journeys, too, were not performed without the greatest difficulty. We read, for example, that little more than half a century since the journey from Hyde Park Corner to the Royal Palace at Kew was on occasions quite an undertaking. Indeed,

on several occasions Kings and Queens have found themselves veritably 'stuck in the mud' whilst undertaking the journey.

Roads, however, came to be improved, and, concurrently with such improvements, considerable strides were made in the development of road vehicles, road travelling attaining its zenith in the palmy years comprising the first quarter of this century. During that time so good were the roads, so well-appointed the coaches, and so fleet the cattle, that on the great routes out of London—as, for example, the London and Holyhead—the average speed had attained to the surprising figure of twelve miles per hour. For example, the Holyhead coach, leaving London at eight at night, and travelling viâ Oxford, arrived at Shrewsbury between ten and eleven the next night. Leaving again at eight o'clock on the following morning, it reached its destination, Bangor Ferry, about ten or eleven the following night.

This luxurious mode of road travelling, however, was destined to be of short duration, for its death-knell began to resound in the ears of 'whips' when the shrill neigh of the 'iron' horse began to be heard. Even the unromantic, iconoclastic engineer, who cannot do less than view with intense satisfaction the rapid development of rail locomotion, in looking upon one of our modern majestic eighty-ton locomotives, cannot compare it with the noble old mail-coach—with its single seat for the mail guard, and its box for containing the blunderbuss used for protecting Her Majesty's mails, as the coach rattled across the country upon a frosty winter's night to the music of the footfalls of four fleet and sleek hippomobiles, and the jingle of trappings and splinter-bars—without a sigh of regret on the one hand, and thankfulness to gentlemen lovers of horses on the other hand, who have had the pluck to resuscitate this delightful mode of travel, and to carry it out in a way of which every Britisher, even though he be not a 'sport,' must feel proud.

The days of long-distance road travelling by horse-drawn vehicles are over, but the days for the production by our engineers and carriage-builders of self-propelling equipages worthy of our position amongst nations are with us.

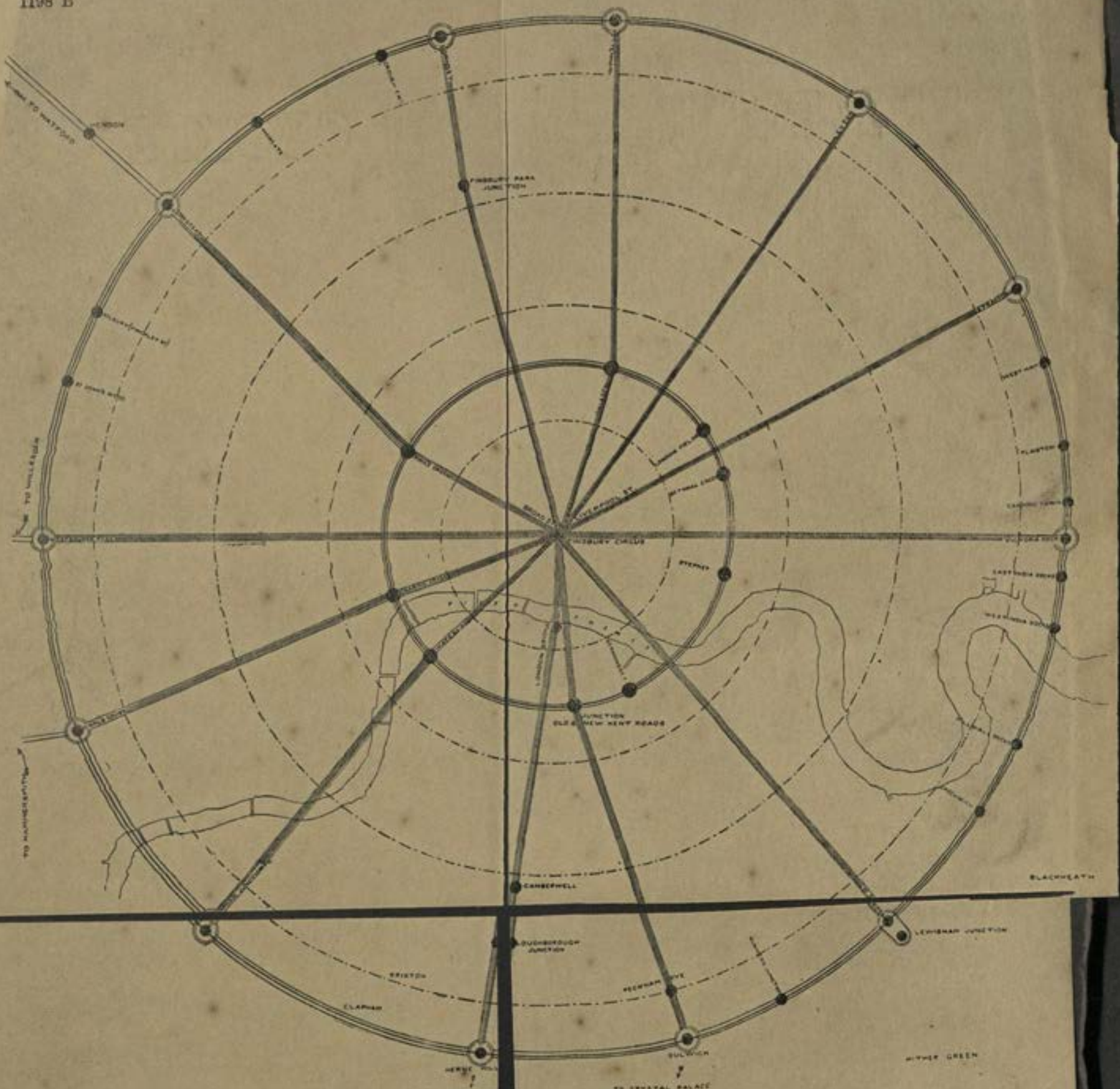
APPENDIX II. TO CHAPTER VII.

NOTE ON SUBTERRANEAN INTERCOMMUNICATION IN LARGE TOWNS.

In opening this chapter, I referred to the fact that England, after a period of strange lethargy concerning urban locomotion —unhappily, not uncharacteristic of our nation—had suddenly awakened, and that a period of activity had as suddenly set in. Good *might* have been wrought out of evil: for the very backwardness afforded opportunity for systematization which would not have presented itself with steady growth. As with standardization, so with systematization: the Briton is found wanting. This shortcoming has unfortunately found expression in the utter want of systematized forethought which has become evidenced in the supply of our great Metropolis with subterranean means of mechanical personal locomotion. Haphazard engineering would indeed be an appropriate euphemism to apply to the state of things (limiting, of course, the word 'engineering' to its popular or organizing significance). As million after million of capital is spent in twopenny tubes, Londoners will appreciate that such has been expended in the building of a gigantic jumble —a jumble which in a few years will cause bitter disappointment to ourselves; will hold us up to ridicule in the eyes of our American cousins, and enable Continental countries committed to State-controlled or aided railway transport to sneer at the value of English freedom of action. This is matter of double regret, for—and this is unusual—the danger was foreseen by many, and a preventative sought in the appointment of a Parliamentary Committee on 'London underground railways.' The work of such Committee, however, has proved to have been almost entirely nugatory. Surely it was nothing short of satirical as regards the potence of the powers that be, that it should have been left to the Amalgamated Society of Railway

Servants to direct public attention to this matter of vital importance. Surely, moreover, there cannot exist an engineer of repute in the Metropolis who would not cordially endorse the view put forward, that the various schemes were 'promoted without the slightest regard for the *needs of London as a whole*, and with no fixed idea of the *interchange* of traffic or thought for the *general welfare*.' The problem was neither recondite nor intricate. It might almost have been solved by an intelligent school-boy: for it required no complicated bisections, trisections, trapezoids parallelograms; neither parallelepipeds nor other elaborations, such as those with which Burke puzzled the poor unfortunate orange-woman. To fulfil the requirements, nothing more *nor less* was necessary than to picture the various subterranean communications as presenting the appearance of *a wheel provided with several felloes* lying flatwise beneath the heterogeneous labyrinth of gas, water, hydraulic, electric, pneumatic, and other services of the vast Metropolis.

This will be best understood by reference to the diagram. The hub of this tunnel-wheel would, of course, be situated centrally in the City—as, for example, in Finsbury Circus. From thence a number of spokes would radiate, and the wheel would be multi-tyred: for, after proceeding a certain distance, the spokes would meet with a tunnel of circular contour forming the first felloe of the wheel, whilst prolongations of the spokes would intersect other of such tunnel-felloes as shown. At the time of the appointment of the Parliamentary Committee, two of such spokes already existed—namely, the electric railway running to Stockwell, and the shorter one running to Waterloo. An additional spoke was shortly afterwards added—namely, the 'twopenny tube' running from the Bank to Shepherd's Bush, whilst again another spoke was formed by the prolongation of the Stockwell-Bank line to Islington. Up to this point all was well; but then commenced the unsystematized and disconnected arteries which, in such a relation, are as incongruous and inefficient in the *scheme as a whole* as an artery in human physiology found to be totally disconnected from the general circulation.



Proposal for Subterranean Intercommunication in Large Towns—exemplified in the case of London.

Proposal for Subterranean Inter-communication in Large Towns—Exemplified in the Case of London.

The wheel of communication* would be composed of two subterraneous felloes and one (the outer) above-ground tyre. The spokes would be formed of rectilinear underground railways — obviously forming the *shortest possible* routes from any point on one side of the city to any point upon the other. The *shortest possible* journey from any one point to another would be performed by changing from one rectilinear railway, or spoke, to another by means of the circular railways or felloes, the points of interchange being indicated upon the tickets issued. The cross-lines of communication, or spokes, although rectilinear, would each constitute a complete circuit. Thus trains starting, for example, from Clapham Junction would proceed in the direction of the arrows, and, passing through the central station beneath Finsbury Circus, would continue their journey to Leyton; here they would turn end for end by describing a short circle, and return viâ the central station to their starting-point (Clapham Junction). Thus all trains would continue in the same direction day and night, and it would never be necessary to detach a locomotive from any train. The rectilinear cross-lines on convergence at Finsbury Circus would pass around the central station in concentric circles, by which means trains could arrive from all directions and discharge *every few seconds*, though the service on each independent line might not exceed the rapidity hitherto attained of, say, twenty trains per hour. By a systematized scheme such as this, passengers travelling in all directions could do so without crossing London. The outer felloes or tyres would be most valuable for the facilities they would offer for *through carriage travelling*. It will be seen that carriages could be detached from the express trains on all main lines running into London at the main junction station, and interchanged to any other main line in the country.

The smaller circular tunnel would have a mean diameter of about three miles, the larger a diameter of about nine miles. Stations would be provided on each at points appropriate to the requirements of the neighbourhood under-run; but especial care should be bestowed upon the position of the stations of intercommunication with existing above-

* The punctuated circles show zones having a radius of one, two, three, and four miles respectively from Finsbury Circus.

ground railways, the termini and junctions of which would be connected by electric lifts with the underground stations.

The three-mile diameter circular tunnel (commencing at the south and travelling with the hands of the clock) would be provided, amongst others, with stations at:

London Bridge, connecting by lift with the terminus L.B.S.C. Railway; terminus S.-E. and C. Railway; also South London Electric Railway (the circle would be deviated to obtain this).

Waterloo, connecting by lift with the terminus L.S.-W. Railway; also Waterloo and Bank Electric Railway.

Charing Cross, connecting by lift with the terminus S.-E. and C. Railway; also Metropolitan and District Underground Railways; also Baker Street and Waterloo Electric Railways.

King's Cross, connecting by lift with the terminus Midland Railway; terminus G.N. Railway; also Metropolitan Railway; also Electric Tube Railways.

Dalston, connecting by lift with the junction North London and G.E. Railways.

London Fields, connecting by lift with the junction G.E. Railway.

Bethnal Green, connecting by lift with the G.E. Railway.

Stepney, connecting by lift with the junction G.E. main line.

Bermondsey, connecting by lift with the L.B.S.C. Railway and S.-E. and C. Railway.

The circular tunnel, having a mean diameter of about nine miles, would be provided, amongst others, with stations at:

Dulwich, connecting with junction (Herne Hill), S.-E. and C. Railway.

Clapham Junction, connecting with L.S.-W. and L.B.S.C. Railways.

Earl's Court, connecting with Metropolitan and District Railways; also Brompton and Great Northern Electric Railways.

Westbourne Park, connecting with G.W. Railway.

St. John's Wood, connecting with Metropolitan and Gt. Central Railways.

Kilburn (Finchley Road), connecting with L.N.-W. Railway (main line) and Midland Railway (main line).

Hampstead, connecting with Midland Railway (main line), L.N.-W. (main line), also Great Central Railway (main line).

Highgate, connecting with G.N. Railway.

Crouch End, connecting with G.N. Railway and Midland Railway.

Hornsey, connecting with G.N. Railway.

Tottenham, connecting with Midland and G.E. Railways.

Leyton, connecting with G.E. Railway.

Stratford, connecting with junction G.E. Railway (main line).

West Ham, connecting with District Railway and G.E. Railway.

Plaistow, connecting with L.T. and S. and G.E. Railways.
Canning Town, connecting with G.E. Railway, North Woolwich, etc.
Victoria Docks, East India Docks, West India Docks, would connect with Blackwall Railway, G.E. Railway, etc.
Millwall Docks, connecting with G.E. Railway and Greenwich Ferry.
Greenwich, would connect with North Kent and Mid Kent Lines, S.-E. Railway, also L.C.D. Railway system.
New Cross, would connect with L.B.S.C. Railway, also S.-E. and C. Railway.
Nunhead Junction, would connect with S.-E. and C. Railway, also Crystal Palace and Lewisham branches.

The overground railway, or tyre, would have a mean diameter of about thirteen miles, and, amongst others, would have stations at:

Willesden Junction, connecting with L.N.-W. Railway (main line).
Child's Hill, connecting with Midland Railway (main line).
Southgate, connecting with N.L. and Great Northern Railway (main line).
Edmonton, connecting with G.E. Railway.
Chapel End, connecting with G.E. Railway.
Snaresbrook, connecting with G.E. Railway.
Ilford, connecting with G.E. Railway.
Woolwich, connecting with S.-E. Railway.
Kidbrooke, connecting with S.-E. Railway.
Hither Green, connecting with S.-E. Railway.
Catford, connecting with S.-E. Railway.
Lewisham Junction, connecting with S.-E. and C. Railway.
Sydenham Hill, connecting with L.C.D. Railway.
Crystal Palace, connecting with L.C.D. Railway.
Streatham, connecting with L.B.S.C. Railway.
Earlsfield, connecting with L.S.-W. Railway.
Putney, connecting with L.S.-W. Railway and District Railway.
Hammersmith, connecting with District Railway.
Wormwood Scrubs, connecting with G.W. Railway (main line).

Diagram showing Subterranean Railways—Present and Prospective—of London.

This diagram will serve to show the disjointed and chaotic effect of want of organization in regard to railway intercommunication in the Metropolis. It depicts the state of things which will exist in five or seven years' time, when millions will have been spent and a great mileage constructed. Yet there will be no properly systematized means of intercommunication.

DESCRIPTION OF DIAGRAM.

1, 1. Metropolitan.
2, 2. Central London.
2A, 2A. Proposed extension of Central London.
3, 3. City and South London.
3A, 3A. Sanctioned extension of City and South London.
4, 4. Bank to Waterloo.
5, 5. Great Northern and City.
6, 6. Great Northern, Piccadilly, and Brompton.
6A, 6A. Branch from King's Cross to Aldwych.
6B, 6B. Branch from Piccadilly Circus to British Museum.
7, 7. Baker Street and Waterloo.
7A, 7A. Extension sanctioned to London Bridge.
7B, 7B. Extension sanctioned to Lambeth and Vauxhall.
8, 8. Hampstead, Euston, and Charing Cross.
8A, 8A. Branch to Highgate Archway.
8B, 8B. Sanctioned extension to Edgware.
9, 9. North-West London.
9A, 9A. Proposed extension to Victoria.
9B, 9B. Proposed extension to Clapham Junction.
10, 10. Deep Level Metropolitan.
11, 11. Euston, King's Cross, and Angel.
12, 12. City and North-East Suburban.
13, 13. City and Crystal Palace.

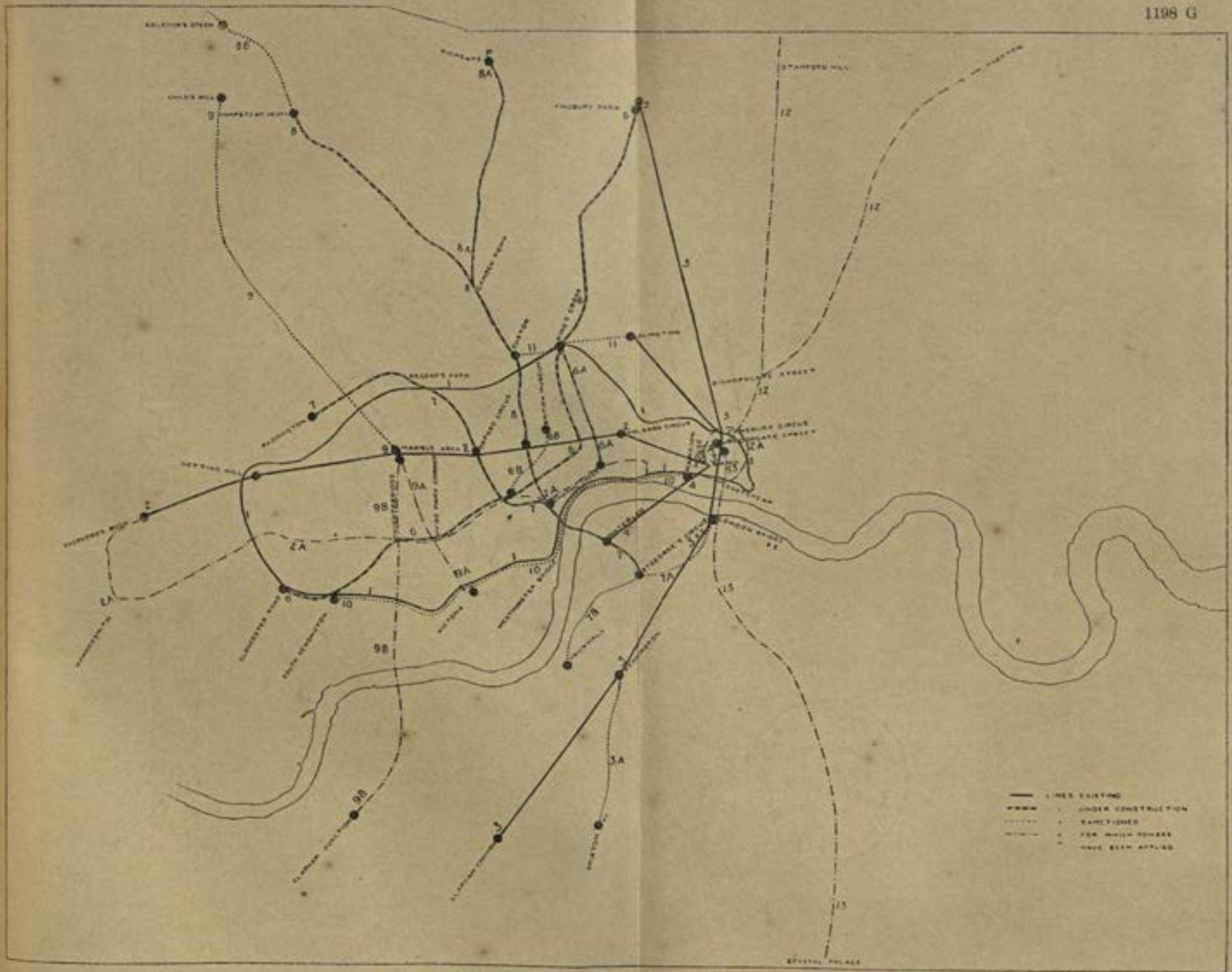


Diagram showing Subterranean Railways—Present and Prospective—of London.

APPENDIX III. TO CHAPTER VII.

NOTE ON THE RULE OF THE FOOTWAY.

TRAVEL by road—strange though it may appear—is far more dangerous than travel by rail; nevertheless, the dangers of the road are incomparably less than the dangers of our streets. Street dangers, however, may be materially reduced by systematic control. In regard to a new city, therefore, apposite regulations should be drawn up and *enforced from the first*, for then no annoyance from compliance would be experienced, nor would anything have to be unlearned.

The point I desire to touch upon is the rule of the footway. From time immemorial a fashion has obtained as to the manner of conducting horses—and at a later date vehicles—upon highways, this having come to be known as 'the rule of the road.' Yet, strange though it may appear, notwithstanding the fact that our centres of trade and commerce have grown to such Antæan proportions, little has been done in regard to the establishment of a like rule respecting pedestrian traffic. The theory has been advanced that the rule of keeping to the 'near' or left side of the road, and of passing overtaken vehicles on their 'off' side, originated in the solicitude evinced by our ancestral cavaliers for the riding-habits of their fair *equestriennes*. This would appear probable, as also would a still more important consideration, namely, that a knight on the near side of his 'faire ladye' would be in the worst position for affording her protection; he would therefore have ridden upon her right hand, in order that his lance-arm might be free. In regard to pedestrians, much the same would have obtained. In the Middle Ages every gentleman wore a sword buckled on his left side; in addition to this many wore a dagger, which was usually sheathed in the right side of the belt. Obviously, a man wishing to take another unawares in passing would pass on the left, so as to conveniently and the more rapidly draw and use his dagger. For this reason it was considered the very worst of bad form to pass another by the

left, and the practice has survived to this day. These theories are, however, only borne out in practice in Great Britain and, I believe, Bohemia. Thus, both upon the Continent and in the United States the rule is the reverse of ours. These rules concerning the road are now so firmly established that they could not be altered, even if any valid reasons existed for a modification, and I am not aware of any.

With regard to a rule for pedestrians, it would certainly conduce to urban convenience if such a rule were enforced, especially in large towns. Such rule, however, should be inaugurated after careful reflection as to its appositeness relatively to the already established rule of the road. What little has been done in regard to the systematic regulation of urban pedestrian traffic has been by the display of a notice-board requesting pedestrians to 'keep to the right.' Now, I venture to suggest that this being 'right' is wrong. In support of this many considerations could be brought to bear; I will mention one or two, from the conviction of the fact that it is a matter well worthy of careful consideration, and that the judicious agreement and inauguration of a suitable rule should be forthwith carried out. There can be little doubt that our streets and highways will in the near future be far more extensively made use of both by muscularly-propelled and mechanically-propelled vehicles. Therefore the establishment of an efficient regulation may be fraught with considerable public advantage hereafter. If careful consideration be given to the matter, I am persuaded that a unanimity of opinion will result in favour of a *common rule*—that is to say, that *the rule for vehicular should also hold good for pedestrian traffic.*

As to reasons for this, I would say—First: Seeing that use is said to be 'second nature,' it comes natural to those accustomed to ride horses or drive vehicles to give way by keeping to the left. Why, then, put a large section of the public to the necessity of altering this predisposition, and remembering to do that which is strange to them and diametrically opposed, on dismounting!

Secondly: The number of cyclists, both male and female, now using our highways is enormous. These, from the daily exercise of this rule, naturally find it most convenient to give place to

both approaching vehicles and pedestrians by keeping to their 'near side.' In this relation it would appear high time that the statement be publicly made that cyclists are amenable to the same rule of the road as horse-drawn—and, indeed, horseless—vehicles, when we find a judge asking counsel if such a rule existed. A judge recently thus interrogated counsel: 'Is the rule of the road applicable to cyclists? They seem to ride in and out among the other traffic, and to get through as best they can. Is the ordinary rule of the road applicable to them?' A universal rule is badly wanted in our large towns, and if it be important for pedestrian traffic, what is to be said of combined vehicular and pedestrian traffic?

Let us take the case of what happens every hour of the day—a motor-carriage proceeding along a country road and being met by a pedestrian. Supposing both to be in the centre of the road, how is the driver of the vehicle to know what the pedestrian will do? If he (the pedestrian) is to follow the rule it has recently been attempted to establish by going to the *right*, he will obviously walk right into the teeth of danger, for it is the driver's *duty* to keep to his left. Assuming the driver to observe in ample time the movement *according to rule* of the pedestrian, and he give way by going to his 'off side,' he not only does that which is wrong, but he exposes his vehicle to danger by getting in front of an approaching vehicle keeping to its proper side of the road.

Thirdly: Another important point is that of a pedestrian stepping off the kerb in front of a noiseless vehicle, such as a cycle. If pedestrians are to 'keep to the *right*,' of course accidents from this cause *must* occur. If, however, they follow the vehicular rule, it is obvious that invariably the pedestrian nearest the kerb will proceed in the *opposite* direction to the vehicular traffic, and consequently will be able to see all vehicles approaching. The danger to pedestrians in regard to stepping in front of cycles or other rubber-tired vehicles is not only apparent, but real. In a recent case where a cyclist was fined for colliding with a pedestrian whose back had been towards him, and who stepped off the path in front of the approaching cycle, the

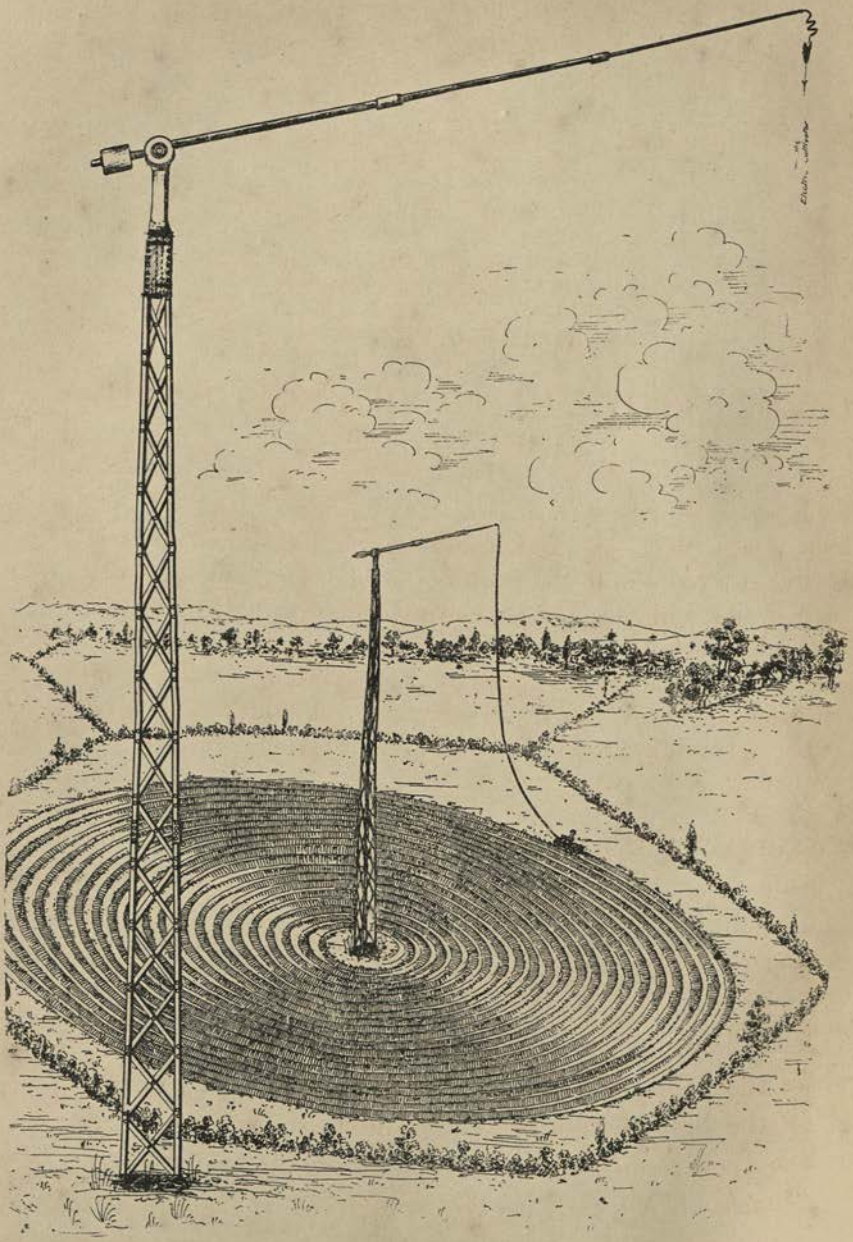
aggrieved cyclist cogently asked the magistrate how he was to know the pedestrian was about to step off the path. To this the magistrate replied, 'You must ring your bell *in case* a person should wish to step into the road.' From this it would appear that because certain municipalities have thought fit, *without mature consideration*, to endeavour to establish a rule that pedestrians should 'keep to the right,' it is necessary cyclists should be put to the trouble, and the public to the annoyance, of constantly ringing bells. Now, what I have said concerning country roads holds good, and in far more pronounced degree in regard to streets. For example, the great noise of urban traffic drowns the noise of individual vehicles, and hence what applies to the silently-moving bicycle on the country road also applies to the pneumatically-tired motor and the rubber-tired brougham in towns. Again—as happens every few minutes of the day—with persons in a hurry stepping off a path in order to pass more leisurely progressing pedestrians, with the *erroneous* system of keeping to the right, the person stepping into the roadway must perforce have his back towards the on-coming vehicular traffic.

One disadvantage alone occurs to me in reference to the use of a particular side of the footway, inasmuch as our fair ones would be put to the slight inconvenience of having, during their peregrinations in inspecting the commodities displayed in shop-windows, to walk in a given direction. This slight constraint, however, they should gracefully concede in view of the extensive use made of the roadways by lady cyclists, and the consideration shown them by drivers of vehicles.

Much more might be said upon the subject, but I trust the foregoing may suffice to draw the attention of city organizers and County Councillors to it, and, moreover, to convince them that *the pedestrian rule should be identical with that for vehicles.* If *two* rules are to exist, then the paradox referred to in the lines,

> 'The rule of the road is a paradox quite :
> In driving your carriage along,
> If you go to the left you are sure to go right,
> If you go to the right you go wrong,'

will become still more pronounced, and one may be excused if puzzled.



Author's Suggestion for the Continuous Electric Cultivation of the Land.

CHAPTER VIII

GARDEN CITIES IN THEIR RELATION TO AGRICULTURE

'In rural occupations there is nothing mean and debasing. It leads a man forth amongst scenes of natural grandeur and beauty; it leaves him to the workings of his own mind, operated upon by the purest and most elevating of external influences. Such a man may be simple and rough, but he cannot be vulgar. The man of refinement, therefore, finds nothing revolting in an intercourse with the lower orders in rural life as he does when he casually mingles with the lower orders of cities.'—WASHINGTON IRVING.

AXIOMATICALLY, any measure having the effect of fostering and increasing that most ancient and most important industry Agriculture must *per se* be a measure of National importance. This is an axiom applicable to all countries. In regard to the British Isles, however—in dealing with problems having for their object either the amelioration or extension of the industry—more thought than is necessary elsewhere should be bestowed upon the *particular branch* of Agriculture to which it is wisest to devote attention and effort. This necessity arises

from various conditions, favourable or unfavourable, existing as characteristics of the British Isles. Of these may be mentioned such points as (*a*) our inability to provide for the whole of our wants; (*b*) the cost to ourselves in otherwise fulfilling them; (*c*) our restricted acreage; (*d*) our excessive rainfall and the absence of sunshine; (*e*) the uncertainty of our climate. In regard to the first, seeing that we are only able to feed ourselves but partially, it is clearly obvious we should bestow our attention upon that branch at present costing us most dearly. To ascertain what this branch may be, one must have recourse to statistics bearing upon the subject. I have here only entered upon those I think necessary to elucidate the points I desire to touch upon.

At the very outset our thoughts inevitably turn to the 'staff of life,' and lead us to consider ways and means of increasing the volume of wheat grown by ourselves with the collateral advantages of improving the condition of the agricultural labourer and providing for the employment of larger numbers of these national wealth-producing units.

If, however, we look somewhat more deeply into the problem, one is forced to admit that this is not the most prudent manner of attacking it. Before, therefore, venturing upon anything in the nature of suggestions, it will be advisable to make this clear to ourselves. Although my object is to trace and define the effect readjustment of production would have upon our islands, and primarily to limit

the benefits to ourselves, I feel there is only one proper method of viewing the matter, and that is to look upon the British Empire as part and parcel of the British Isles, and each as a branch of one great family—concrete and interdependent. It is beyond question that Great Britain has now arrived at that epoch when it behoves every patriotic son to learn **'to think Imperially'**—admonition of untold potency recently uttered by one of her greatest patriots.

I would ask my readers to do this and to take the above-mentioned view in reading my remarks, because both arguments and calculations are materially influenced by it. It is clear that if our Empire be looked upon as one great commercial firm composed of various departments and a number of branch establishments, a scheme of interworking may be devised, culminating in an all-round profit to the firm and such as could not be worked out if the branch establishments—in this case our colonies—were considered as apart from ourselves. A moment's thought will serve to show that in regard to such an aggregated whole it might be to its advantage for one branch to desist from the production of a specific commodity and to entrust its cultivation to another. If the reader will be good enough to look upon our subject from this point of view, then I feel that possibly he may, with me, cease to deplore certain facts we have been in the habit of deploring; to appreciate, moreover,

that we, in striving to continue with certain branches of agriculture for which our climate and conditions are not propitious, may have been striving in an ill-advised direction.

Let us for a moment analyze this view in regard to the product first touched upon—viz., wheat. *Primâ facie*, nothing could be more deplorable than the fact that the result of half a century of British farming has been to allow our acreage of land under wheat cultivation *to fall to little more than a third of what it was when our population amounted to little more than one-half of its present number.* If, however, as I suggest, we look upon our home lands and those of our colonies as one great farm, engaged in the production of food for one great Empire, then a little thought will serve to show us that that which appears to be a loss is, as a matter of fact, a financial gain. To comprehend this we have only to consider the magnitude of the bills we pay for bread, vegetables, and meat respectively in regard to such of these edibles as we are ourselves incapable of rearing upon that small portion of the vast farm comprised within the British Islands.

In regard to the first item (wheat), we fulfil our requirements in respect to this edible alone at an annual expense of £47,250,000. Of this amount we pay to the foreigner the enormous sum of £28,000,000, but to our colonies only £8,750,000; whilst the value of the wheat raised *within* the British Isles is but £10,500,000.

Thus we see that if we ceased to grow wheat entirely we should only increase our extraneous indebtedness by a matter of about 20 per cent. (in actual figures 22⅔ per cent.). But, and this is the important point we must not for a moment lose sight of, wheat-growing is *not* a profitable occupation for the British farmer, nor is it that capable of affording the greatest amount of employment to our labourers. Therefore, continuing for the moment to deal with our subject in a purely business-like spirit, these facts at once show that the firm should delegate the production of this commodity to one of its branch houses.

Obviously, the next point to determine is, to what extent would the British farmer be benefited by substituting for wheat-growing another branch of agriculture for which our climate is better suited? Our sustenance may conveniently be taken to be comprised under four heads—bread, meat, vegetables, and fruit. We are, therefore, brought to consider the magnitude of the other three bills. We will take that for our vegetables. Unfortunately *data* such as would enable us to ascertain the value of our home-raised vegetables does not exist; but this, unhappily, we do know—that Dame Britannia *every year* has to write a cheque of no less than £5,465,881 for vegetables and fruit sent in to her from abroad. Now, to grow the *fifth* part of the wheat we consume we still have under cultivation 1,701,000 acres; moreover, the return from their

cultivation is of the most unsatisfactory nature; moreover, as our agriculturists inform us, *none* of the paltry return is attributable to wheat-growing *per se*. It is sufficiently obvious, therefore, that if these 1,701,000 acres of land—especially if they formed broad girdles around Garden Cities—were no longer used for wheat-growing, but for the supply of the *five and a half million pounds worth* of vegetables and fruit required by us, then this enormous sum would pass through the hands of the British farmer, instead of passing into the pockets of the foreign agriculturist.

But the point may be raised that this acreage would be in excess of that required for the supply of fruit and vegetables, the two commodities under consideration. This therefore leads us to inquire into the amount of that proportion of our dairy-produce bill we are forced to pay annually to foreign countries. The magnitude of this bill, again, is vastly surprising, especially when one considers how perishable are the commodities involved and the difficulty of getting them delivered fresh from abroad, for it amounts to no less a sum than £27,139,413.* The total sum paid by us to

* This amount is made up as follows:

Butter	£17,992,404
Cheese	1,978,981
Eggs	6,099,418
Milk	6,224
Cream	27,386
Poultry and game	1,035,000
	£27,139,413

foreigners for vegetables, fruit, and dairy produce is no less than £32,605,294, or more than *three times the total value of our home-grown wheat.*

It is clear that the execution of this gigantic order by our own farmers would result in the putting under market-garden and dairy-farm cultivation of a vast number of acres of land, the profitable use of further capital in agriculture, and the employment of a small army of cultivative artisans. I speak of them advisedly as 'artisans,' rather than as 'labourers,' because the day must soon arrive—ought, indeed, to have arrived—when the cultivator of the soil shall be a skilled artisan—a *status* to which he has already attained elsewhere. It would, perhaps, be as well to refrain from any calculation of the actual acreage that would be entailed, because, unhappily, the acreage necessary for the British agriculturalist is greater than that required by his foreign competitors, who have exercised, and now reap the reward of, their prescience in regard to the value of the application of science to the land. We have no need of calculations to prove that many thousands of acres of land are to-day tilled and

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This amount is exclusive of the *eight and a quarter* million pounds worth of Colonial dairy produce. I have also purposely taken no account of the *two and a half* millions for vegetables and fruit received by us from the Channel Islands and other colonies, whilst all fruits and vegetables—such as cannot be appropriately grown by us in the open air—have also not been taken into consideration.

profitably utilized abroad in fulfilment of *our* requirements, which cultivated acreage would be transferred to the face of our own islands were we to supply for ourselves a greater proportion of our vegetable and dairy produce needs.

So much, therefore, for points *a* and *b*.* As to *c*, the fact that our acreage is restricted serves only to emphasize the necessity for the more profitable employment of such as we are possessed of. As to (*d*), excess of rainfall and absence of sunshine, these, whilst being matters of vital importance in regard to cereal crops, are to a far greater degree negligible in connection with vegetable growing and dairy-farming; whilst in respect to the last, uncertainty of our climate, this should but direct our attention more earnestly to intensive culture, a form of agriculture to be found, unfortunately, in a far more advanced state elsewhere than in Great Britain, and upon which I venture very briefly to touch in the appendix to this chapter.

Such a readjustment of agricultural production, looked at from the purely business standpoint, would be redolent of financial advantages; but from the point of view of national security it presents a disadvantage. If, however, we reflect upon this point, we shall find it to be of far smaller moment than at first sight it would appear. We have to ask ourselves how long in case of war could we supply ourselves with corn under normal conditions?

* See p. 1204.

The reply is sufficiently unsatisfactory, for our annual yield of wheat would but support us for about three months. A good deal has been said lately about the necessity for providing national granaries. Now, it is obvious, in this respect, that the disadvantage I refer to would not go beyond the necessity of increasing the size of such granaries to the extent of storing an additional amount equal to that of one year's crop. But the fact appears to have been largely overlooked that the provision of such granaries would *not* obviate the necessity of keeping up a navy of appropriate magnitude for the safe convoy of corn from one part of the Empire farm to another, more especially our own little islands. For our navy we *must* keep up, its *raison d'être* lying quite outside the subject we are now considering. On *a priori* grounds, therefore, instead of entering upon enormous expenditure in respect of national granaries, it would be far more prudent to spend money in additions to the navy, and instead of having to face a huge annual outlay in the former regard—represented by the interest of money so expended, and which in equity should be debited to the cost of wheat, thus, from the national point of view, increasing the cost of bread—we should obtain better value for our money in expending it upon the upkeep of a navy of increased strength, the expense of which could justly be otherwise debited. Better to do business with *our own* '*branch houses*,' whose fighting material would

be at our disposal in time of need, than with competitors whose armaments would be directed against us.

Continuing to view our subject as affecting the interests of a great business house, a glance at the figures brings out another most unsatisfactory point, for we observe that whilst we send orders to our own branches amounting in the aggregate to only £8,750,000, we purchase wheat from foreigners to the enormous figure of £28,000,000.* What, we surely should ask, would the directors of a business concern do upon disclosure to them of such trading ratios? There can be but one reply. They would proceed to recast their business arrangements in suchwise that more of their needs should be supplied by their own departments. Such a readjustment, current events would seem to indicate, will have to be entered upon in regard to our national trading in connection with the subject now under consideration. If the view be taken—and in view of the foregoing remarks it might be a very wise one—that the amount of our home-grown wheat should be increased, then it is obvious the readjustment must be such that wheat-growing shall become a profit-earning occupation for our home farmers.

Here we at once become confronted with a problem very difficult of solution. The readiest

* Nearly three times what we ourselves grow.

means of converting a losing operation into a profit-earning occupation is to increase the selling price of the entity produced, but in the case before us, *ex necessitate rei*, the rise in price of one product must *not* entail the rise in price of another manufactured from it—practically a *non possumus* in ordinary industrial processes, unless the conversion be of such nature that some bye-product results which more than balances the loss. Nevertheless, it is probable solutions will be forthcoming when they are called for, and it might be interesting to indicate one such: Suppose that an import tax, with preferential treatment to our Colonies, should be put upon wheat, in order to raise its price to that at which it would become a profit-earning entity for the British farmer—instead of a losing one, as at present—and that from the revenue thus obtained bread-making should be subsidized just to the extent necessary to prevent any rise in its price, the deficit being made good out of taxation of other imported *manufactured* goods, in regard to which we at present have to submit to most unfair treatment, as, for example, American and German machinery, which is frequently 'dumped down' into our country at less than its cost price, whilst upon *our* machinery going into America or Germany an enormously high taxation has to be met.

Let us assume, for example, that an import duty of 9s. per quarter is put upon foreign wheat, and one of 7s. upon Colonial wheat. The revenue

obtained would be £11,187,500. The expenditure in bread subsidies £15,187,500. The deficit, made good from taxation of manufactured goods, such as those to which I have referred, £4,000,000.

This would work out as follows:

REVENUE.

Foreign wheat, 80,000,000 cwt. at 9s. per qr. ...	£9,000,000
Colonial wheat, 25,000,000 cwt. at 7s. per qr. ...	2,187,500
Subsidy to bread (paid from taxation upon manufactured imports)	4,000,000
Total ...	£15,187,500

EXPENDITURE.

Increased cost upon total consumption (135,000,000 cwt. at 9s. per qr.)	£15,187,500
Total ...	£15,187,500

The final result, it will be observed, is **the price of bread remaining the same;** the British farmer would obtain a profit of **£3,375,000,** the Colonial farmer £625,000 (by means of the preferential treatment), whilst the increase of price obtainable from home-made machinery would make our engineering works busy, and, at the same time, the wages of the agricultural labourer would be increased.*

* The following tables show at a glance the result of our present system of business relations:

DECLINE IN YIELD AND ACREAGE AND INCREASE IN IMPORTS.

Cereal Years.	United Kingdom Wheat Crop Area.	United Kingdom Wheat Crop (less Seed).	Wheat and Flour Imports.	Available for Consumption.	Population.
	Acres.	Qrs.	Qrs.	Qrs.	
1854–55	4,037	16,427	2,983	19,410	27,767
1859–60	4,020	12,004	4,516	16,520	28,715
1864–65	3,686	15,180	5,500	20,680	29,700
1869–70	3,977	12,301	9,921	22,222	30,760
1874–75	3,822	12,898	1,705	24,603	33,629
1879–80	3,048	5,047	6,410	21,457	34,388
1884–85	2,745	9,307	8,001	27,308	36,200
1889–90	2,545	8,771	19,093	27,864	38,065
1894–95	1,454	4,373	25,000	29,373	39,600
1895–96	1,731	6,793	22,693	29,486	39,800
1896–97	1,693	6,492	21,845	28,337	40,000
1897–98	2,155	8,754	22,147	30,900	40,337
1898–99	2,052	7,830	23,263	31,093	40,708
1899–00	1,845	7,500	22,355	29,855	41,000
1900–01	1,701	6,000	24,392	30,392	41,300

NOTE.—The 000's are omitted throughout the table.

FALL RESULTING FROM 'FREE' IMPORTS AND TAXED EXPORTS.

	1854-1885.	1900-1901.
Area of wheat crop in United Kingdom in acres	4,037	1,701
Total wheat crop in United Kingdom in qrs.	16,427	6,000
Imported wheat and flour in qrs.	2,983	24,392
Total wheat and flour consumed	19,410	30,392
Population	27,767	41,300
Area per head of population in United Kingdom	0·181	0·041
Crop „ „ „	0·591	0·145
Imports „ „ „	0·107	0·590
Total wheat consumed per head	0·698	0·735

Now, if the production in the United Kingdom of wheat had proceeded *pari passu* with the increase of population as well as the increase in consumption *per capita*, the figures for 1900 1901 ought to have been:

	Should have been	As against
Area of wheat crop in United Kingdom in acres	7,880	1,701
Total wheat crop in United Kingdom in qrs.	25,727	6,000
Imported wheat and flour in qrs.	4,665	24,392
Total wheat and flour consumed	30,392	30,392

The foregoing means to an end is not put forward as a scheme of fiscal readjustment, the object being to show that it would be quite practicable to cause wheat-growing to become again a profit-earning occupation for the British farmer. From the considerations set out, however, and taking the broader view that all argument should be based upon the welfare of the Empire as a whole, it is clear that to seek to benefit our home agriculture and to provide for the retention of the home farm-labourer by means of wheat-growing is economically imperfect. Other and more apposite courses are open to us. There are, I venture to suggest, branches of agriculture far better suited to the climatic conditions of our islands than wheat-growing by means of which the now called-for change could be wrought. Change, however, with us is long in the coming, and therefore it might be desirable to ask also if we can do nothing in amelioration by other means. The reply, again, is that we should look to science in regard to cericulture, as we are now, but tardily, commencing to do in connection with other of our industries. The antidote, just set out, had as its basis amelioration of trading conditions by the

simplest means—viz., the raising of the selling price; there is, of course, the opposite and more difficult alternative—reduction in cost of production. The first means which spring to one's thoughts are mechanical means, but, seeing that these have already been brought to a high degree of perfection, the future would not appear to promise great things in this connection. Two material modifications are at least possible—the more extensive employment of electro-motive power and a change of method. I have elsewhere spoken of the surprising lead in regard to machinery production within late years taken by our cousins on the other side of the Atlantic. If one carefully analyzes the causes of this, one finds it to be due principally to the discarding by them of intermittent reciprocal or 'to-and-fro' motions, and their substitution by continuous circular movements. To-day we English engineers are mere pupils of our cousins in regard to that important operation in mechanical engineering establishments known as 'milling'—the shaping of metal into desired forms by means of continuously revolving cutters, the very preparation of which has now become a huge Transatlantic trade, our reciprocating machinery, our shapers, slotters, planers becoming rapidly cast aside.

Now, from time immemorial the tillage of the land has been by 'to-and-fro' movement. The question to be asked is, Has the time arrived for a like transition in regard to agriculture? Space

prohibits one's entering upon the subject, but the reader will at once appreciate that, over and above the great loss of time entailed by to-and-fro motion, still greater disadvantages arise in regard to heavy prime cost of plant and the extra labour required. For example, in ploughing by steam *two* steam-engines are required to every plough, the one to pull it forward, the other to pull it backward; hence the efforts which are now being successfully made to produce *locomotive* and self-contained motor agricultural implements through the instrumentality of the recently invented 'petrol motor.'*

In the illustration is shown a means of carrying continuous circular cultivation into effect by means of electricity. Imagine upon the agricultural belt of a Garden City a number of tall posts being erected, each furnished with a spar or 'boom' counter-balanced so as to be capable of keeping taut a cable conveying electricity to the electro-mechanical cultivator. It is clear that, in a manner analogous to the mode of working in electric tramways—but without the necessity of an overhead wire—the implement, be it plough, 'cultivator,' harrow, or roller, could circumambulate around the power-supply post over a large area and with great efficiency if the fields were of hexagonal shape. It is, moreover, clear that if a number of such posts were situated at approximately equal distances upon the 'belt,' the electro-mechanical cultivators could

* See 'Horseless Road Locomotion,' by the Author.

pass from one farm to another, making the tour of the entire agricultural girdle.

Then there is the further means open to us of applying science to growth. Grain has been sown and reaped in all countries and in all centuries, and the methods have varied but very slightly the one from the other. When the means of transport were meagre the agriculturist could command his own price, therefore the people fed in the good years and starved in the bad ones; but railways and steamships have entirely altered the conditions. Is it possible to alter the conditions of growth so as to assimilate them with the altered conditions we live under? Scientific investigation has answered this most unmistakably in the affirmative. I must here, however, touch upon but one point. Some years ago Major Hallett devoted his attention to the selection of the seed grains of wheat and to the individual planting of each grain, as opposed to the 'broadcast' scattering methods usually employed. This investigator obtained, on the South Downs, results little short of astounding. He found that were 'room to grow' allowed to it a single grain would throw up and nurture no less than from ten to twenty-five separate stems each bearing an ear of corn; moreover, that each of such ears, instead of containing the usual 60 to 68 grains, produced at least double that number. A single grain of seed, therefore, produced from 250 to 2,500 grains instead of the usual

average of from 120 to 180 grains. These interesting experiments of Major Hallett's—it need scarcely be said in our country, so oblivious to the practical value of science—were received with much doubt, but a few applied to him for seed and sought to obtain similar results. The effect leads one to point out an axiomatic principle—viz., that scientific research and experiment should only be entered upon by those prepared to enter into all the minutiæ, and to be undeterred by one or more failures; for that was how the few tests made elsewhere ended, the causes being readily explicable. Indeed, it may be said that failure was insured from the outset. The seed, well adapted to the chalky soil of the Downs, was unsuitable for the other soils; the time of planting should have varied with the locality, etc.—indeed, in no case were the conditions similar to the original experiments, no proper compensating deviations being made. With characteristic despondency, therefore, the matter was allowed to drop, so far as our country is concerned. It was, however, taken up abroad by Professor Dessprèz and also Professor Grandeau, each of whom made experiments in the single planting of wheat grains, and obtained extraordinary and similar results to those of Major Hallett.

Dessprèz asserts that an average yield of 600 grains for each grain planted is *easily attainable;* Grandeau, indeed, gives instances of a yield of 2,000 to 4,000 grains for each seed planted. Such results as these

are surely all that is wanted to impress us with both the value and the enormous potentialities of applied science, yet, unhappily, this is appreciated in the most meagre degree throughout the country. Even in connection with so simple an experiment as the one just detailed, the reader can at once deduce far-reaching results from intelligent appreciation and practical application — results, as the foregoing remarks may have served to show, extending to such matters of importance as our national security in time of war, our national expenditure, and the building up, by affording additional employment, of increased national wealth.

Those who have already appreciated these principles are to-day reaping vast benefits from them, and in this relation I should like to be allowed to draw attention to a popular error arising out of the characteristic despondency I have had occasion to refer to. It seems to be assumed that elsewhere, with more propitious climatic conditions, it is only necessary to cast seed upon the land, and satisfactory crops will result as a matter of course. This is far from being the case, and I bring it forward in seeking to show that, in this connection, there is a vast sphere of usefulness Garden Cities are eminently well adapted to fulfil. Far from it being the fact, for example, that the vital matter of the efficient manuring of the land may be neglected in regard to corn-growing, the cultivation of the vast tracks in the United States and in our own Dominion of

Canada has already had to be carried to a high standard.

When wheat was first grown in the United States land was cheap, and large areas were sown on one enormous farmstead; two or three men then represented the extent of the permanent labour required. When harvest-time came labourers were collected broadcast from far and wide, the corn was reaped, threshed, and sent to market, the land reploughed and resown, whereupon the labourers departed, leaving the two or three permanent hands to winter again in loneliness on the land. Want of labour, indeed, led to the devising of machines, almost human in their method of performing their work. But the land was soon found to become exhausted of its nourishing properties, and with this low degree of culture the crops obtained were small and the soil so materially deteriorated that, had this method obtained for long, and been persevered in, America would soon have ceased to be a competitor in the grain market. The Government, with laudable prevision, recognised this, and advocated the substitution of scientific farming for the more or less rough-and-ready methods. To this end the Senate, in 1861, voted a land grant consisting of 30,000 acres to be set aside in each State for each Senator and representative in Congress to which the State was entitled. By this Act 9,600,000 acres of land were appropriated. Some of this was sold, the money so obtained being invested—as required by the Land

Grant Act—in safe security, and the income devoted entirely to the maintenance of land, buildings, and repairs thereto, to be utilized in the improvement of land culture and the teaching of agriculture. By the year 1882 there had accumulated some $9,000,000. Besides the land unsold, the buildings, apparatus, and grounds used as experimental farms or colleges, were then valued at $6,531,844, making a grand capitalized value of no less than 15½ million dollars. But the result to American agriculture is scarcely to be estimated, being out of all proportion to any expenditure that may have been incurred; colleges for technical instruction and agricultural teaching have been caused to spring up throughout the length and breadth of the land. Experimental farms exist everywhere. The farmer has at his command and disposal the entire results of years of patient study and the hard toil of men whose constant duty it is to grapple incessantly with the problems of how to produce the utmost from the soil, and never to be satisfied with a 'good crop,' but ever to strive for a better. The local farmer has not to learn from men well versed, it may be, in theory, but who have never seen that part of the country cultivated by him, for there is a college at his door, as it were, a practical establishment in actual work competing indeed with himself for good results, yet all the while showing him and proving to him by demonstration how best to farm his own land. The farmer's son is not limited in his education to the

generalities of agriculture, but he also learns and makes practical acquaintance with the particularities of the soil he will have to cultivate when he shall return to the paternal homestead, such instruction being imparted to him by men who had made the soil of that particular district the study of their lives.

On such lines as these was also founded the Canadian Experimental Farm at Ottawa, perhaps the most perfect of its kind extant, and it is my earnest hope that the details I give in the appendix, which I am enabled to publish through the courtesy of the Canadian authorities, will not only interest the reader, but—in conjunction with the other remarks I have ventured to make—enable him to join me in the view that Garden Cities are potent to play a most important part in regard to our agriculture. Each City, it need scarcely be added, will have its own polytechnicum and technical college, and if the instruction be properly carried into effect—efficiency and practicability being the watchword—the students of each, sons of farmers tilling the environing lands, will be theoretically taught within the college walls, but *practically instructed upon the very land.*

MARKET-GARDENING.

THE branch of agriculture, it is obvious, which will derive permanent benefit from the establishment of Garden Cities is that of market-gardening, which is fortunate, seeing it is that branch capable of supporting the largest amount of labour per acre. This will arise from causes differing from those usually obtaining. The establishment and growth of towns create a demand for 'market-garden' produce, for the reason that the inhabitants cannot grow it for themselves. In Garden Cities, however —with their large area of agricultural girdle—there will not only be local demand to supply, but an excess of produce to distribute among less fortunately situated towns. By calling to our aid the latest scientific developments applicable to culture, adopting means of rapid collection and transit such as have been referred to in the last chapter—especially if this be done in combination with the co-operative system of disposing of the produce, such as I have already referred to in connection with other rural industries —there opens up to the dwellers in Garden City a

grand vista, not only of an overflowing cornucopia of the 'fruits of the earth,' but an abundance of healthful and profitable employment in three separate branches of agriculture — namely, in vegetable gardening, in fruit growing, and in flower-culture.

Market-gardeners are subject to great losses, we may be told, for are not arguments usually brought forward, from this point of view, when this subject is broached? It might be well, therefore, to glance at these sources of loss, and then to consider how they would be beneficially affected by the establishment of Garden Cities throughout the country. The sources of loss are chiefly due to (*a*) freightage; (*b*) market commissions, rings, and middlemen; (*c*) glut of particular kinds of produce; (*d*) perishableness of the commodities when once gathered.

This certainly looks a formidable list of disabilities under which, it cannot be gainsaid, the market-gardener labours in actual practice, and one would be overstepping the mark in averring that such would all disappear upon the introduction of Garden Cities. Yet if we consider them seriatim and dispassionately, we shall at once appreciate that, under the altered conditions that would obtain, the amelioration would be so great as to amount practically to an entire abolition. The first (freightage) would, it is obvious, be entirely exorcised. The produce would not require to be sent by railway at all; and, together with the saving on freight, material economy would also result from the reduced amount of packing

requisite and the cost of transport and re-collection of returned 'empties.' In connection with freight, moreover, another serious item of expense has also to be faced—namely, the cost of getting the produce to the railway-station. Clearly market-gardeners cultivating lands forming the girdles of Garden Cities would get their produce to market at a cost *less* than that they now incur by horse-traction to the nearest railway-station. The changed conditions, moreover, would render very convenient the substitution of motor-haulage; hence a still further reduction in cost of getting produce to market would ensue.*

The second, also a formidable disability, albeit incapable of total exorcism, would be very materially modified to the cultivator's advantage; 'rings' could not be made in produce sold direct to the consumer, nor could 'middlemen' insinuate themselves, whilst, having regard to the fact that the Cities would build their own markets upon land purchased by them at agricultural value, market dues and stall rentals could be reduced to the minimum. The third, aberration to steady trading and source of loss arising from two causes—(*a*) the producer being 'out of touch' with the market, and (*b*) the time occupied

* Mechanical haulage has already been resorted to in taking market-garden produce to Covent Garden from outlying districts, such as Hounslow, Feltham, etc., the ordinary market waggons being hauled—usually two at once—by a miniature traction-engine

in transit—would, it will be seen, entirely disappear, and with it be overcome the loss at present brought about through the perishableness of market-garden produce.

For years past now great and vehement have been the outcries in regard to the transport of agricultural produce, and the complaints levelled against the mal-administration of our railway companies, yet little has been done in mitigation, for the unfortunately sufficient reason that little *can* be done under present conditions. Preferential rates in favour of the foreigner—*primâ facie* a glaring injustice to the home-producer—whilst telling in favour of the consumer, are easily explicable, for it is quite impossible to carry goods in small quantity at such low rates as may still prove remunerative in dealing with merchandise in large bulk. Neither is it possible to transport goods from numerous stations at similar rates to those obtaining as between the docks and the termini. Over and over again railway directors have stated that precisely similar rates could be charged if farmers could arrange so to combine as to send the produce of a whole district from a single station—a point I have touched upon in the previous chapter. This matter is by no means one limited in its effect and detriment to a single branch of industry. On the contrary, if carefully considered, it will be found to be a subject in importance nothing short of *national* moment, for the freightage question is not confined to produce of great intrinsic

value and difficulty of culture: it covers and detrimentally affects the simplest crops, and entails vast and quite unnecessary national expenditure.

National expenditure in regard to our shortage is colossal. Let us, by way of example, take the case of such common and everyday-consumed produce as

IMPORTS OF VEGETABLES, 1898-1902.

POTATOES.

Year.	Quantity Imported.			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
	Cwt.	Cwt.	Cwt.			
1898 ...	5,499,532	1,192,094	1,252,196	1,335,805	547,356	578,107
1899 ...	3,797,674	1,338,115	1,361,337	965,422	601,427	612,304
1900 ...	7,800,245	1,054,486	1,110,717	1,670,763	538,813	563,806
1901 ...	5,976,064	1,020,654	1,100,662	1,369,831	447,680	481,756
1902 ...	4,408,240	1,268,098	1,290,850	1,099,336	481,134	490,096
Total ...	27,475,755	5,873,447	6,115,762	6,441,157	2,616,410	2,726,069

Grand total, £11,783,636. Average, £2,356,727 per annum.

In the third table the items under the heading Vegetables unenumerated, and other than the foregoing, represent our annual expenditure on such articles as lettuces, cabbages, spinach, peas, beans, etc., entities coming in from Holland, Belgium, and France. A similar list of green fresh vegetables from the Channel Islands accounts for the amount under the head of British Possessions. It should here be explained, lest it might be thought the amount of these imports was decreasing and we were asserting our supremacy, that before the year 1900 under this head were included tomatoes and some other articles since removed from the table and tabulated separately. The year 1900 seems to have been phenomenal in regard to imports of green vegetables, but careful research points to the fact that year by year the amount of our imports from Belgium, Holland, and France greatly increases.

potatoes and onions. I have compiled from the Board of Trade Returns for the last five years figures at once interesting and surprising, from which we see that Great Britain's average annual expenditure in regard to the last-mentioned edible alone (onions) amounts to no less than £872,099, our markets being

supplied from great distances, such as Holland, Spain, and Egypt. Even this large amount falls far short of that paid by the British consumer, for it must be

ONIONS.

Year.	Quantity Imported.			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
	Bushels.	Bushels.	Bushels.			
1898 ...	5,924,199	—	78,316	783,699	—	9,210
1899 ...	7,004,874	—	13,425	843,822	—	1,930
1900 ...	7,046,828	—	40,277	846,963	—	5,533
1901 ...	7,270,068	—	25,350	866,765	—	2,632
1902 ...	7,597,219	—	8,270	998,292	—	1,650
Total ...	35,043,188	—	165,638	4,339,541	—	20,955

Grand total, £4,360,496. Average, £872,099 per annum.

understood that the prices taken are the wholesale declared value at the port of landing, the goods fetching considerably more by the time the public

TOMATOES.

Year.	Quantity Imported.			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
	Cwt.	Cwt.	Cwt.			
1898 ...	—	—	—	—	—	—
1899 ...	—	—	—	—	—	—
1900 ...	676,335	156,070	625	504,443	287,147	749
1901 ...	624,355	169,584	56	467,231	266,198	42
1902 ...	648,039	135,855	—	485,747	214,379	—
Total ...	1,948,729	461,509	681	1,457,421	767,724	791

Grand total, £2,225,936. Average, £741,978 per annum.

has been supplied. In regard to the first mentioned commodity (potatoes), it comes as a surprise to learn that France, Belgium, Holland, and Germany

annually draw from our exchequer a sum exceeding *a million sterling.* This, moreover, it should be

VALUE OF IMPORTS OF VEGETABLES OTHER THAN THE FOREGOING.

Year.	Value in £.		Total.
	Foreign Countries.	British Possessions.	
1898	1,254,737	426,049	1,680,786
1899	1,274,388	470,170	1,744,558
1900	718,251	48,143	766,394
1901	345,486	44,343	389,829
1902	399,768	68,643	468,411
Total ...	3,992,630	1,057,348	5,049,978

Average per annum, £1,009,995.

added, is not because our produce is inferior to that of the foreigner, for whereas foreign potatoes (in 1902) fetched an average of 5s. per hundred-

IMPORTS OF FRUIT, 1898-1902.

APPLES.

Year.	Quantity Imported.			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
	Bushels.	Bushels.	Bushels.			
1898 ...	1,848,146	26,204	1,610,570	574,539	8,565	533,517
1899 ...	2,109,152	25,573	1,752,020	611,640	7,345	574,503
	Cwt.	Cwt.	Cwt.			
1900 ...	1,227,363	7,962	901,178	677,604	4,938	547,053
1901 ...	1,206,184	16,749	624,026	722,946	7,313	459,836
1902 ...	1,743,444	6,228	1,100,073	1,160,273	4,319	763,201
Total ...	—	—	—	3,747,002	32,480	2,878,110

Grand total, £6,657,592. Average £1,351,518 per annum.

weight, the cultivators in our Channel Isles obtained 15s. per hundredweight for theirs.

Why Germany, Holland, Belgium, and France should grow potatoes for us, and we thus become *their* customers to the tune of no less *than a million*

PEARS.

Year.	Quantity Imported.			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
	Bushels.	Bushels.	Bushels.			
1898 ...	451,359	10,626	40,310	207,985	5,579	13,795
1899 ...	554,064	11,114	17,768	254,955	6,312	11,396
	Cwt.	Cwt.	Cwt.			
1900 ...	466,466	8,421	10,435	356,880	7,909	9,980
1901 ...	334,273	11,267	14,613	282,881	9,242	13,530
1902 ...	482,271	5,576	9,635	427,741	6,102	11,795
Total ...	—	—	—	1,530,442	35,144	60,496

Grand total, £1,626,082. Average, £325,216 per annum.

sterling every year, is a question that may well be asked. The reply is again—the application of

PLUMS.

Year.	Quantity Imported.			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
	Bushels.		Bushels.			
1898 ...	917,851	—	4,397	431,288	—	3,378
1899 ...	553,545	—	4,728	289,770	—	4,282
	Cwt.		Cwt.			
1900 ...	422,493	—	526	391,052	—	1,644
1901 ...	260,742	—	2,958	238,309	—	5,396
1902 ...	539,358	—	1,778	511,267	—	3,792
Total ...	—	—	—	1,861,686	—	18,492

Grand total, £1,880,178. Average, £376,035 per annum.

scientific principles to the working of the soil now recognised under the apt title 'intensive culture.' For those who may feel interested in this matter, I

have appended some details to this chapter. The enormous value of the subject is most potently

STRAWBERRIES.

Year.	Quantity Imported			Value in £.		
	Foreign Countries.	Channel Isles.	British Possessions.	Foreign Countries.	Channel Isles.	British Possessions.
1898 ...	—	—	—	—	—	—
1899 ...	—	—	—	—	—	—
	Cwt.	Cwt.				
1900 ...	52,219	6	—	85,921	28	—
1901 ...	38,573	31	—	51,132	158	—
1902 —	40,193	18	—	58,005	75	—
Total ...	130,985	55	—	195,058	261	—

Grand total, £195,319. Average, £65,106 per annum.

brought home to us when we consider the fact that foreign vegetables sold in our markets are usually

FRUITS IMPORTED FROM FOREIGN COUNTRIES ONLY.

Year.	Quantity Imported.			Value in £.		
	Cherries.	Currants.	Gooseberries.	Cherries.	Currants.	Gooseberries.
	Bushels.					
1898 ...	401,810	Not recorded.	Not recorded.	230,828	Not recorded.	Not recorded.
1899 ...	281,230	,,	,,	153,642	,,	,,
	Cwt.	Cwt.	Cwt.			
1900 ...	242,508	64,462	26,045	308,340	87,170	14,626
1901 ...	212,632	70,402	21,735	213,548	75,308	11,420
1902 ...	166,359	76,080	27,564	216,421	92,112	16,919
Total ...	—	—	—	1,122,779	254,590	42,965

Grand total, £1,420,334. Average for the last three years only, £345,288 per annum.

grown upon land the rental of which is *much higher than that of our own*, so that the excuse so often set up is quite untenable; from the *data* given in the

appendix will be gleaned the surprising fact that French market-gardeners, for example, pay quadruple and upwards, rising, indeed, to as much as six times the rental per acre of our own cultivators. Nevertheless, complaint is frequently made in regard to our own produce exposed for sale in the same markets alongside that sent in from abroad, that in many cases it is scarcely remunerative. This demonstrates *most conclusively* that if the same degree of scientific training and the application of it

IMPORT OF FLOWERS.

Year.	Value in £.		
	Foreign Countries.	Channel Isles.	Total.
1900	131,842	68,743	200,585
1901	146,416	78,495	224,911
1902	167,139	100,142	267,281
Total	445,397	247,380	692,777

Average per annum, £230,925.

were carried to our own soil a remarkable reversal could be made to obtain.*

* Prince Krapotkin (no mean authority), writing in the *Nineteenth Century*, says: 'If the soil of the United Kingdom were cultivated only as it *was* thirty years ago, 24,000,000 people, instead of 17,000,000, could live on home-grown food; if the 1,590,000 acres on which wheat was grown thirty years ago—only these, and no more—were cultivated as the fields are cultivated now under the allotment system, which gives on the average forty bushels to the acre, the United Kingdom would grow food for 27,000,000 inhabitants. If the now cultivated

Such figures and facts, I venture most emphatically to contend, speak most eloquently for the future of Garden City market-gardening, and for the scope of successful and profitable working their agricultural girdles will afford to the British agriculturist.

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area were cultivated as the soil is cultivated on the average in Belgium, the United Kingdom would have food for 37,000,000 inhabitants; and, finally, if the population in this country came to be doubled, all that would be required for producing the food for 70,000,000 inhabitants would be to cultivate the soil as it *is* cultivated in the best farms of this country, in Lombardy, and in Flanders, and to cultivate the meadows, which at present lie almost unproductive around the big cities, in the same way as the neighbourhoods of Paris are cultivated by the Paris *maraîchers* All these are not fancy dreams, but mere realities—nothing but modest conclusions from what we see round about us, without any illusion as to the agriculture of the future.'

FRUIT CULTURE.

HAVING touched upon our vegetable imports, I would direct attention to the fruit tables. From these we find that every year we pay away *nearly two and a half million pounds sterling* for such homely fruits as the following:

Apples	£1,351,518
Pears	325,216
Plums	376,035
Strawberries	65,106
Cherries	224,555
Currants	84,863
Gooseberries	14,321
Total	£2,441,614.

I have omitted all such fruits as grapes, citrons, oranges, lemons, bananas, and the like, for it may be conceded that such fruits can be better grown abroad; but why Great Britain should buy her apples and pears from France, Belgium, Holland and the United States, her plums and cherries from the first three of the above-named countries and Germany, strawberries and currants from France and Holland, and her gooseberries also from the last-named country, is only to be explained by want of enterprise and organization upon the part of British fruit-growers.

Yet fruit-growing has greatly increased in Great Britain during the last thirty years, as evidenced by these figures :

EXTENT OF ORCHARDS IN GREAT BRITAIN.

Country.	1872.	1878.	1888.	1898.
England	143,295	161,228	194,040	220,220
Wales	3,052	2,646	3,357	3,690
Scotland	1,874	1,541	1,781	2,149
Total	148,221	165,415	199,178	226,059

Of our orchard counties Devon heads the list with an area of 27,000 acres, Hereford comes next with 26,000, Kent has 25,000, Somerset 24,000, Worcester 20,000, and Gloucester 19,000, all the others having less than 5,000 acres apiece. But when we consider their commercial importance we find, with the exception of Kent, that all of them devote their energies to the production of cider apples ; whilst such counties as Berks, Bucks, Cambridge, Essex, Middlesex, etc., all somewhere in the 2,000 to 3,000 acre limit, produce much larger commercial orchard crops.

Of all our counties Kent easily leads the way for small fruit culture, having no less than 22,000 acres, whilst the next county, Middlesex, has but 4,172 acres, Yorkshire and Worcester have each just over 3,000 acres, Norfolk 2,800, Cambridge 2,700, Hants 2,200, and Lancaster 2,000. Eight other counties have more than 1,000 acres each, and the same number

more than 500. The remaining twenty-eight of the fifty-two English and Welsh counties have less than 500 acres of fruit-growing land.

In Kent fruit-growing has attained to a high level: trees are carefully selected, varieties specially studied, war continually waged against pests. Apple, plum, and damson trees have an undergrowth of currants, gooseberries and cobnuts. Jam factories and fruit preserved in bottles all help to profitably absorb the yearly harvest. The advantages of a broad belt of fruitland around a Garden City, wherein—possibly in conjunction with a British sugar factory—would be found jam and preserve factories for the supply of bottled and dried fruits, as well as crystallized fruits, need not to be expatiated upon. But it must always be borne in mind that good results can only be arrived at by hard and diligent work, combined with correct and accurate technical knowledge. And herein lies our weakness. The good work of the 'men of Kent' has been achieved by rule-of-thumb, confirmed by long and ofttimes bitter experience, and all has been done by private enterprise and individual effort. What is wanted, concurrently with reduction in freightage and increased facility of transport, is the dissemination of information from a central office, and united action in the exorcism of pests and such like, controlled by a central authority, in a manner similar to that adopted, not only in the United States, but in those countries I have cited as being our most formidable competitors.

GROWTH UNDER GLASS.

THERE is still another branch of fruit-growing to be considered—namely, that of growth under glass. This is an industry which has practically grown up within the last thirty years. It may be safely said that prior to that time there were not 100 acres covered with glass-houses. At the present day 1,200 acres will be an estimate well within limits. The greater part of these are hot-houses — *i.e.*, houses heated usually by means of hot-water pipes, and the crops grown therein consist of grapes (about 2,500 tons per annum), tomatoes (about 12,000 tons), and cucumbers (about 900,000 dozens). Around London there is a large number of these glass-house nurseries, one at Finchley covering no less than 34 acres and consisting of houses which, put end to end, would run for nearly six miles in length. This establishment hopes in good seasons to grow 150 tons of grapes, besides 20,000 dozen of cucumbers, together with a continuous output of tomatoes from May to Christmas. There are many nurseries round London, but the best are all on the north side of the city. Grapes, tomatoes, cucumbers, with here and there

flowers, are the staple crops. Cheshunt has also a great number of hot-house nurseries; but perhaps the district which has the largest output away from London is Worthing. Here the soil, unlike that of London, is favourable to the vine. There are more than 50 acres under glass round Worthing, where glass-houses are assessed at no less than £100 per acre—about double as much as anywhere else. An account of the extensive development of the industry at Worthing and its work in this connection may be taken as practically representative of the history of this industry in England. I may therefore be forgiven if I refer to this development. The glass-houses first set up were very small, and were erected by a Mr. Paul, his example being soon followed by Mr. Barnwell—whose sons still own a nursery in Worthing—and again by Mr. E. Purser. But when, seven-and-twenty years ago, Mr. Beer erected a house 150 feet in length and 28 feet in width, the good people of Worthing were astonished, and predicted disaster. When they saw the crop ripening they declared that not in all England was there a demand which would take the supply of this one house. Undaunted by such fears, Mr. Beer's response was to build other hot-houses, one no less than 180 feet by 30 feet. Then followed two years of denunciation by critics, two years of silence, and then a rapid, hurried endeavour on the part of others to share in the profits thus opened up to them. To the great advantage of families of moderate means,

prices have greatly fallen during the years that have succeeded these first attempts. Whereas Christmas grapes at first fetched a guinea and more the pound, now it is only the very special kinds that reach more than 6s. to 8s. a pound in the most expensive seasons; the greater part of the crop goes at 1s. per pound, or even less. Vineries to pay well must be of the larger size, when a profit of 10 per cent. is said to be easily realizable. It is surprising that more attention has not been given to peaches and nectarines; few growers appear to have attempted to produce these commercially, yet to those that have the prices have been good. Some growers give attention to such things as mushrooms, French beans, and early peas; but nothing like the amount of these 'catch' crops has been produced in this country to be compared with the production and export of the French and Channel Island growers. The two latter have always a crop of one kind or another maturing under their vines. There are, however, many nurseries where flowers are grown so as to practically fill up the house, and the vines in this case are subsidiary to the flowers, and produce their crop in the same manner. It seems necessary to keep the fruit and flower crops apart.

The running expenses in the ordinary way of 'hot' houses are, of course, materially higher than those of 'cool' houses. Every gardener in the Channel Isles has his cool-house to raise the requisite seeds for transplanting into his garden, to bring

forward his tomatoes until the summer sun is sufficient for outdoor ripening ; to grow mushrooms in the dark, damp floor, above which is built the stage supporting his pots and seed-boxes. Then his vine or peach-trees, and often both, fill up the house. In this way he gets plants in his garden when otherwise seeds would only just be peeping through the earth. When he cuts one crop of lettuce, he has another crop of plants to put into the space ; he carefully brings forward his potato-seed in the dark, damp part, and when it has shot out promising sprouts he puts them into a good soil made with plenty of manure. He no sooner digs these than his ground is occupied with cabbage plants or celery. Thus one crop succeeds another in exactly the same satisfactory manner as attends the procedure of the French, Belgian, Dutch, and American gardeners. To these men the cool-house is invaluable—in fact, the garden plot without the house in their eyes is more or less useless.

In the opening up of land for intensive culture consideration should certainly be given to that latest addition to scientific gardening—the travelling glass-house. These structures, which may be heated or not, travel on rails and may be easily moved if the rollers be kept properly oiled. They have been used in Kent and at Worthing, the practice having been to grow chrysanthemums under them during the late autumn ; then to get mushrooms, early radishes, etc. ; then to move the houses over strawberry-beds

or tomatoes. Used in this way to help forward the ripening process of strawberries, raspberries, or currants, to protect tomatoes, or produce early green vegetables, to say nothing of their value in covering roses and chrysanthemums, they should have a useful future. At present they are somewhat expensive—about 18s. per foot run for a house 22 feet 5 inches wide, with an extra 3s. 6d. per foot for rails outside the house ; and time must show if their life is likely to be affected detrimentally by the moving operations.

Whereas in regard to fruit-growing the hot-house has been reserved for the production of grapes, tomatoes, and cucumbers, in flower culture it has more cosmopolitan usages—from orchids of glorious hue and monstrous shape down to humble mignonette. All floral growth is to be found in season—or perhaps more often out of it—enjoying the warmth and protection of the glass-house. To the flower-grower for profit it is essential that he should have glass-houses, both hot and cold, for he may want to force on one lot of plants or retard the flowering of another. He always wants to protect his plants from frost, and his propagating of necessity, whether it be by seed or cutting, must be done in the shelter of a glass-house. In this section of gardening the movable glass-house should prove of value, seeing that it can be shifted over any particular bed at a moment's notice.

Applied science, there can be no doubt, is destined to do much for this country, not only in regard to

field agriculture, but also in regard to market-gardening; for we have already much ground to make up in the latter before we place ourselves on an equality with the French *maraîchers*. It has always appeared to me regrettable that little or no attention has been directed by market-gardeners to reaping the benefits Electro-Horticulture has it in its power to bestow.

Some six-and-twenty years ago, when the late Sir William Siemens was directing his attention to the subject, I planted two beds of flowers, allowing those in the one to grow under natural conditions, whilst constraining the others to grow continuously by suspending above them a powerful electric light, and I found as a result that the electric-light-grown plants were more sturdy, the green of their leaves richer, and the colouring of their blooms more vivid. I well remember, about 1880 or 1881, Dr. Siemens giving me to taste melon that had been grown continuously and entirely by the electric light, and that its flavour was more pronounced and far more delicious than precisely the same fruit grown normally. And now—a quarter of a century later—I have just received, by the courtesy of Mr. L. H. Bailey, Professor of Horticulture, the reports upon Electro-Horticulture of the Cornell University. Fascinating and important though the subject be, I must refrain from dwelling upon it, and content myself with but a reference to the results obtained. Needless to say, the application of science must have

Lettuce Grown in the Ordinary Manner.

Lettuce Grown with Forty Hours of Electric Light.

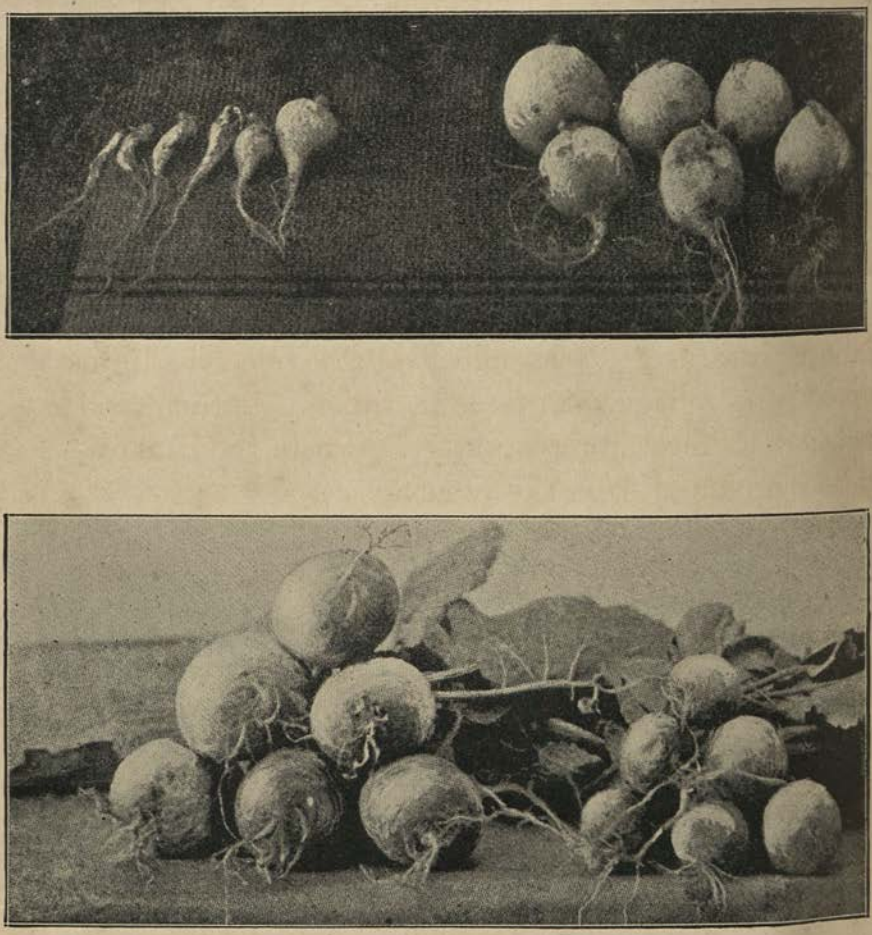
nothing in it of the haphazard. I have endeavoured to show by analogy how far the results of ordinary haphazard cultivation fall short of scientific culture, and much the same must necessarily obtain in regard to intensive culture. To adhere to market-garden produce, I will take the instance of electric-light effect upon the common lettuce. This, grown in houses 20 feet wide by 60 feet long under the influence of ordinary street-lamp electric light of but moderate power—viz., 10 ampères at 45 volts—*i.e.*, 2,000 nominal candle-power—showed markedly beneficial results. The experiments, it should be pointed out, have been carried on for some years, and I will quote the actual words of the last report: 'The benefit was as fully apparent this year. There can no longer be any doubt as to the advantage of the electric light in the forcing of lettuce. The light was started October 19. At that time Boston Market lettuce, four weeks old, was set on bench 4, and seedling plants of Landreth forcing were just showing on bench 3. The transplanted plants (bench 4) in the light compartment soon began to excel those in the dark compartment, and as early as October 27, or a week after the starting of the light, they were perceptibly ahead of the others. In this time forty hours of electric light had been expended upon the plants.* The plants directly under the light, from 7 to 10 feet from the arc, were the first to improve.

* It should be pointed out that the electric light was turned off at eleven o'clock each night.

On November 1 the lighted plants were a fourth larger than the others, and they showed a marked tendency to turn towards the light. The plants, even to the further extremity of the light compartment, gained steadily throughout the experiment, and they were ready for market from a week to ten days earlier than those in the dark house.* In quality and all other characters this lettuce was undistinguishable from that grown under normal conditions.' It should be explained that the electric lamp was supported on a post placed *outside* the house. Even at a distance of 40 feet, with a low roof, from which much of the light was reflected; the plants grew much better than in the ordinary way. 'Perhaps the best illustration which we found,' continues Professor Bailey, 'of the influence of the light upon lettuce was afforded by a crop upon bench 1, into which radishes were also planted. The interception of the light by the radish leaves had a most marked effect upon the lettuce plants which stood behind, the adjacent plants which chanced to be exposed to the full light being larger. The bench, therefore, presented a very uneven appearance when the radishes were removed, and the shadows from the radish-leaves could be traced in the lettuce. Similar results were observed where the dense shadow of a rafter lay across the plants.'

The reader, perhaps, might wish to know whether

* 'Dark house,' of course, means an ordinary glass house in which growth takes place, with the ordinary alternations of day and night.



Tubers grown without and with the Assistance of the Electric Light. The smaller in each Photograph were unassisted.

the good result upon foliage plants would also be found to accrue to tubers. In reply to this, it might be mentioned that in regard to early Egyptian Beets it was found that after 160 hours of light had been expended upon them the Beets were '*at least one-third larger* than those grown in the ordinary way.' Five months after sowing it was found that 57 per cent. of the plants in the light house gave marketable tubers, against only 33 per cent. of those in the dark house. Excellent results were also obtained with radishes, 'the plants in the light house being ahead in every feature.' The effect of the electric light upon both foliage plants and tubers—lettuce and radishes—is most interestingly shown in the illustrations reproduced from the report.

With regard to Electro-Floriculture, I may mention an interesting experiment upon violets and daisies. Strong plants were set in the beds a few days before the light was started. Half of the bed of a hundred plants was covered each night with a black enamel cloth box, provision being made for ventilation, whilst the other half was exposed to the electric light. Three weeks after the light was started the exposed plants began to bloom, whilst no buds could be found amongst the others. It was not until five weeks after that a flower appeared amongst those grown in the ordinary way.

I cannot do better than conclude my short advertence to this interesting subject than by quoting the words of Siemens uttered a quarter of a century ago:

'*The horticulturalist will have the means of making himself practically independent of solar light for producing a high quality of fruit at all seasons of the year,*' and by mentioning that, in one instance at least, the electric light is in regular use in the manner foreshadowed by Siemens. At Arlington, near Boston, U.S.A., Mr. W. W. Rawson makes use of the electric light in the commercial forcing of lettuce. The glass-house is a large one—33 feet in width and 370 feet in length—thus covering nearly a third of an acre. Outside the north wall of this lengthy building are, equally spaced, three ordinary electric-lamp standards, each carrying a 2,000 candle-power lamp, the light being run all night. Mr. Rawson calculates that he receives a gain of five days in a crop of lettuce by the use of these lamps, and as he grows three crops during the winter, the total gain is over two weeks of time. Even at a distance exceeding 100 feet the effect of the light is marked. The horticulturalist finds that the gain from a single crop suffices to pay the cost of running the light throughout the winter.

Summing up the position of fruit-growing in Great Britain, a gentleman who has made an intimate study of the subject at first hand, and acted under the authority of the Royal Agricultural Society, says: 'The production of grapes and tomatoes especially appears to be becoming, if it has not already become, excessive in relation to the demand, *under the existing system of distribution, which involves the payment*

by consumers of from fifty to one hundred per cent. increase in price beyond what growers receive.' Herein, again, we perceive the potential commercial efficiency of Garden Cities. Deplorable losses to fruit-growers arise from three principal causes, all of which by their instrumentality could at once be rectified. These are: (*a*) Cost of transport; (*b*) the intermediate profits, which in many cases may be looked upon as an 'unearned increment' in price; and (*c*) the irregularity of supply, resulting in disastrous glut and deplorable waste. With communities of restricted population fed by the produce of adjacent land all these disabilities would automatically vanish. The first would disappear with the organization of efficient motor-collection and delivery; the second because there would be no use for a middleman between the agricultural zone and the 'Agora'; the third by the supply being regulated hour by hour to the demand.

Recurring to the last referred to disability of the market-gardener—the uncertainty of our climate—it is a most happy augury that the glass-house has proved itself a most valuable and profit-producing adjunct, for, whilst materially increasing the return, due in great measure to the enhanced price obtainable for 'early produce'—one of the reasons the foreigner can outpace our cultivators—it also, in a most material degree, plays the part of antidote to the embarrassing fickleness of our clime. In the foregoing pages we have learnt of the valuable

results obtained by means of home-made 'cool' glass-houses built and used by *amateur* workmen upon their allotments, whilst reference is also made to the recent great development of indoor culture by the professional producer; hence one is led to feel a very wise course upon the part of Garden City authorities would be to fulfil all reasonable requirements of their agricultural tenants in regard to the provision of glass-houses, the cost of building of such having, during the last few years, been reduced in so gratifying a degree.

1250 B

Appropriate Work for Women—Floriculture. A Student of Lady Warwick's Agricultural College at Work in the Glass-house.

FLORICULTURE.

If there is much to be said in favour of fruit-growing in connection with Garden Cities, there is still more to be said to the advantage of the flower cultivator. Flowers grown for profit are, like hot-house grapes, things but of yesterday. Moreover, they have made their own market, and with this great popular advantage—that each decrease in the selling price has opened a wider and wider field of purchasers.

The flower trade has been in progress about thirty to thirty-five years, but its real active and popularly beneficial life has been comprised within the last ten. To-day, owing to the cheapness at which even the very best blossoms can be purchased, and the enormous supplies daily sent to market, flowers now find their way into the homes of the humblest as well as the wealthy—beauteous blossoms, ever cheering and lightening the heart of the honest artisan and weary mill-worker, teaching those lessons of beauty and grace to his children, who will in time grow up to people and appreciate the floral bounty of those Garden Cities we seem to see looming into form from the mists of the near future, where the pleasure of their

cultivation will reflect benefit, not only to themselves, but to the less fortunate *confrères* and dwellers in other and smoke-begrimed towns.

But, to return to the commercial part, so great has become this trade in cut flowers that in market-gardens, and especially in orchards, flowers have succeeded culinary vegetables, whilst ground-crops of strawberries or bushes have been rooted up from under larger fruit-trees, and their places taken by bulbs. At the present day there is a never-ending succession of blossoms, for at Christmas we have Snowdrops, Lilies of the Valley, Violets, and Hyacinths, forced forward in English houses, competing with the out door products from the South of France. Soon after the out door Narcissi of the Scilly Isles appear, then the same products from the Channel Isles, and afterwards the English gardens. This is the signal for the cessation of imported foreign flowers, and the home market holds sway until the earlier Chrysanthemums make their appearance from abroad, contemporaneously with the first of our Michaelmas daisies. Then our own Chrysanthemums from hot and cold glass-houses, as well as outdoor grown, carry us round to Christmas once more.

We find that but few foreign *forced* flowers are imported, save French lilac, which comes into the market for Easter, so that, looking at the figures for imported flowers, we find that they—though quite large enough—are not of the astounding magnitude of the vegetable and fruit imports.

Of all districts engaged in the flower trade, the Scilly Isles are the most favourably situated. Planted on the Atlantic shore, just in a position to be laved by the Gulf Stream, they enjoy a climate that is remarkable for its even range of temperature. The floricultural prosperity of these islands is due to the late Mr. Augustus Smith. On becoming Lord Proprietor in 1834, he found them overpopulated, and that subdivision of holdings had gone so far that there scarcely existed a farm above the size of a cottage garden. Mr. Smith set himself energetically to improve the state of things. He ruled the islands with a benign despotism, putting down smuggling, encouraging emigration, forbidding further subdivision of land. He encouraged the growing of market-garden produce, and for some years the Scillians became noted for their early potatoes, asparagus, and seakale.

Somewhere about the year 1870 (the exact date has never been recorded) Mr. Allen, the steward of the Lord Proprietor, packed and sent to Covent Garden a box of wild Narcissi. For these he received in return a sovereign. When this became known, the farmers started collecting the bulbs and planting them to get stocks.

In 1883 the present Lord Proprietor, Mr. Dorein Smith, went to Belgium, Holland, and the Channel Isles, to see how they cultivated the bulbs. In 1885 he started the Bulb and Flower Association. In that year also the exports reached 65 tons; these then

steadily increased, till in 1896 they reached the enormous total of 514 tons. One hardly realizes what this means. There are eight boxes to the cwt., or 160 to the ton ; therefore 514 tons means no less than 82,240 boxes. In the case of Narcissi, a box holds from twenty-one to fifty-one bunches of twelve blooms, and in that of Anemones, seventy-two bunches. This weight of flowers comprised more than three and a half millions of bunches, (3,598,000), or more than forty-three million blooms (43,176,000). These are grown on a total area of 503 acres. Some 240,000 bulbs of the smaller varieties are required to plant an acre, and about half as many of the larger varieties. The earliest kinds fetch from four to six shillings per dozen bunches at Covent Garden, but later on they fall to eighteenpence, or even a shilling, a dozen bunches.

I have touched upon the floriculture of the Scilly Islands, because I wished to draw analogy between it and what might take place in a Garden City within motor-haulage distance of the Metropolis, or other of our large towns.

The freight from St Mary's to Covent Garden is 8s. per cwt., whilst it often costs the growers 1s. or 1s. 6d. per cwt. to deliver the crop at St. Mary's. The freight is extremely high for the distance (350 miles), for the charge from the South of France (700 to 800 miles) is only 6s. to 7s. per cwt., and from the Channel Isles 4s. per cwt. Still, a good crop of a free-flowering variety at an average of 1s. 6d. per dozen

bunches will bring in a gross return of £100 per acre, so that there is a fair return for the labour required and the capital outlaid.

Now, I have pointed out (see Chapter IX.) in connection with the advantages of cheap fuel-gas in an industrial city, that hot-houses could be most conveniently and economically heated by its means, and have suggested that able floriculturalists of small capital should have provided for them hot-houses at fair rentals by the authorities. In such circumstances, we should be able to effect considerable saving due to freightage, and set it off against cost of heating, with the further advantage that the season of flowering would be entirely under control.

The only parts of England that attempt to seriously compete in the bulb trade with the Scilly Islands are Lincolnshire and Wisbech. Freight on flowers from this district is much lower, being 2s. 4d. per cwt. from Lincoln to London.

In the eastern county gardens it is usual to grow Carnations, Wall-flowers, Violets, Pansies and Polyanthuses, as well as Lilies of the Valley. So perfect has become the cultivation of the latter that, by forcing, blooms are obtained from Christmas to April. Natural-grown cold-house lilies bloom from then till May and June, whilst refrigerated bulbs can be brought to bloom onwards, till it is nearly time for the forced flowers to once more blossom out.

Apart from the two centres of narcissi growing mentioned above, the greater part of the large flower-

growers are to be found within a twenty-mile radius of London. Many of them grow flowers in addition to their green-stuff, or among the trees of their orchards. Many of the hot-house fruit-growers grow flowers as subsidiary to their vines; others grow flowers first, and other things afterwards. A good example of a London district flower-grower's produce is supplied in the following table, supplied by an actual grower:

January and February: Forced narcissi, violets, and roses.
March and April: Outdoor narcissi.
May: Hardy herbaceous plants, Iris Germanica, and Doronicum excelsum.
June: Pyrethrums, Iceland and other poppies, and marguerites.
July: Stocks and erigerons.
August: Echinopsis and asters.
September: Michaelmas daisies and dahlias.
October: Chrysanthemums.

Of course, such a list cannot either include everything or be exact in time, as plants do not bloom in one month alone, but are apt to run over into the next month. Polyanthuses, wall-flowers, and even primroses, are cultivated extensively in the South-West and West of London nurseries. Mitcham, once the home of lavender and Provence roses, now devotes its energies to flowers for selling in pots, or for bedding. Woking also is a flower-growing district, but on the south-east side there are practically no open-air flower-growers, Kent being taken up with its fruit trade, whilst Ponder's End and Waltham Cross devote their energies to roses.

In the flower industry the glass-house, mostly artificially heated, has made as rapid strides as in the fruit industry. Edmonton, Tottenham, Cheshunt, and other places in this district, abound in glass-house floriculture. A year's work of one of these is summed up as follows: Ferns, 200,000; pelargoniums, 80,000; palms, 60,000; marguerites, 20,000; mignonette, 20,000 pots; lobelias, 12,000 pots; clematis, 8,000 plants; besides boxes of many small bedding plants. This was the production of twenty acres of land, of which ten acres are under glass. The land is divided into three: one part being devoted to fruit, and the other two to foliage and flowering plants. About 200 men, boys, and girls, find employment in this nursery.

Concurrently with the great impetus which is being given to agriculture in Ireland by the means I elsewhere deal with, floriculture is also receiving attention. Space will not permit of reference to this, but it may be interesting to mention the success of violet-farming there. I will quote the success of Mrs. Egerton Coghill at Skibbereen, co. Cork, who says:

'I first started my violet farm in 1891. My original idea was to have a vegetable and daffodil farm. I planted a small plot of violets of about 20 feet square more for pleasure than profit, but I found, to my surprise, that I made nearly as much from the sale of the violets off that little bit of land as I did from all the rest of the garden. I therefore increased the area of land under violets year by year, until now I have over two acres of them in cultivation. A great advantage gained by thus slowly increasing the size of the farm is that one is able to provide one's own

runners and plants. Violet runners are most expensive to buy when it comes to planting an acre. Market gardeners charge from 1s. 6d. to 2s. 6d. per dozen plants for Czar violets, and I do not suppose would supply wholesale much under £3 10s. to £4 per 1,000. As it requires about 16,000 runners to plant an acre, this would mean a serious outlay.

'I have found the large Czar violet the most profitable for the market; it prospers especially well with me. I frequently gather blooms an inch in diameter. The poet's "modest violet" is quite a thing of the past so far as sale purposes are concerned, and the Czar violet, standing boldly upright, scorning to hide its head under the leaves, is the one to make money by. The Devoniensis is also a good violet, smaller than the Czar, and in colour a purple-red; it is very frost-resisting, and will often grow well where the Czar does not prosper at all.

'In the cultivation of violets my *modus operandi* is as follows: In October I choose a sheltered field, if possible a bit of pasture land, but land from which a root crop (potatoes, etc.) has just been dug will also suit; in this latter case it is not necessary to plough it until just before planting the violets. If it be pasture land, I have it all ploughed in drills in October, and then leave alone until January, when I get it hacked, softened, and made into long beds of about 4 feet wide, with a trench between each bed for the pickers to walk in. Many people advocate planting in drills, and I believe it is a very good plan, but I have never tried it myself.

'Manure is then laid on the beds—if possible procured from a cow stable and mixed with sand—and about 3 inches depth of earth from the trenches is laid over the manure. Then in February and March I have the runners planted, choosing damp days, and putting each plant about 10 inches apart. Nothing more remains to be done except to replace failures, and to keep the beds well weeded through the summer.

'Early in September I choose a damp day, and give a slight top-dressing of guano. This is continued about every six weeks during the blossoming season, and I find it improves the plants

and blossoms in quantity and quality. My violets begin to blossom profusely in September, but I find they do not travel well until the very end of the month, the weather being still too hot. I make arrangements, and begin sending the flowers away at the end of September or the beginning of October to florists and to the public auctions, always sending the best blooms to the florists. I also supply a good many private orders, sending weekly supplies and casual orders for dinner parties and bazaars, charging about 200 per cent. less than florists' prices, and all flowers carriage paid in non-returnable boxes.

'I employ boys as pickers, and another violet farm near mine employs both boys and girls. We find that they are quicker pickers than men. They pick the violets in neat compact bunches of eight dozen (100 blooms) with eight or twelve good leaves all tied together for the auctions, but most florists prefer the leaves in separate bunches of twelve leaves for every eight dozen blooms. I place all the leaves at the bottom of the boxes, and divide them from the blooms with a sheet of butter-paper, as there is a theory that the leaves take the scent from the flowers. After the violets are picked I have them put in tepid water for an hour before packing; they are then packed in wooden boxes, which can be bought by the gross unmade up, and the boys nail the boxes together on wet or frosty days when there are no violets to pick. I line the box with butter paper, and then lay the bunches in, packing them as tightly as is possible without absolutely crushing them. I find the months of October, November and December the most profitable, far more so than February and March, when the markets are flooded with cheap French violets, and when the soft spring weather has enormously increased the quantity of home-grown violets.

'In frosty weather I have received as much as 1s. 10d. per bunch of eight dozen from the public auction, but these prices do not last long, and I find, taking one thing with another, that the average price all round is about 6d. per bunch of eight dozen. If one has time and skilled labour it is more profitable to make the violets in bunches such as one buys in flower shops, from

eighteen to twenty-four flowers per bunch with two or three leaves. I used to do this, getting 2s. per dozen bunches, but as my farm grew larger, and the output of violets increased from under one thousand to over ten thousand blooms per day, I found it impossible in the short winter days to have that large quantity made up in small bunches. I sell runners in March and April at £2 10s. per thousand for Czars, £3 for Devonienses. This also assists the profits. Carefully managed and with a fairly mild winter, the profits of a violet farm ought to be very considerable. Farmers say that land ought to pay three rents—one for the landlord, one for the farmer, and one for the land. I pay £5 an acre rent for my farm, and would think I had done extremely badly any year that I did not clear five rents for my pocket after having paid all rent, wages, and incidental expenses connected with my violet farm.'

To sum up, floriculture requires careful forethought, considerable energy, and unremitting attention. It is a delightful mode of earning one's living, an occupation at once entrancing, and calling forth the use of the brains as well as the hands; it requires, moreover, capital and technical knowledge, only gained by years of study and practical experience.

Apart from the matter of capital, therefore, women are admirably adapted to take a prominent place in carrying it on. I have elsewhere pointed out how Garden Cities could help them in regard to soft cheese-making and the lighter and more scientific branches of dairy-farming. Here, again, the opportunity presents itself of doing much useful work by the provision, on rental, of glass-houses, and the formation of co-operative flower-farming associations

Flora's Daughters: Students at Work at the Studley Agricultural College.

Gardening : a Student at Work in the Lady Warwick College.

on lines already explained, and of installing upon such flower farms young women who have received apposite training for it—such, for example, as that given at the Lady Warwick College.

Bearing upon this Miss Bradley, the Warden of the College, says:

'It is an acknowledged fact by men and women of wide knowledge and high standing in the agricultural world that women must play a prominent part in staying the depopulation of the rural districts and in bringing people back to the land.

'One feels safe in asserting that if a sufficient number of women will abandon the idea of lucrative and all-absorbing careers as governesses, typists, and clerks, and turn their steps countrywards, they will draw a certain proportion of the sterner sex with them. As these succeed and prosper—and they assuredly will if trained and made of the right material—others will be inspired to imitate them, and the thin end of the wedge will be inserted in the problem of "How to Ameliorate the Conditions of Rural Life."

'It is not enough to be a dweller in the town to become rich or famous, as so many of the thousands who rush thither seem to think. Of 1,000 persons, perhaps one makes a fortune, while the other 999 strive and struggle in bitterest competition with each other merely for the livelihood which they get at the expense of their own health and happiness, or at the expense of those who come

after them. City life under these circumstances, as it is led by millions of our people, is degrading and demoralizing to a degree which is never found amongst a rural population. Close intercourse with Nature cannot fail to have an ennobling influence, helping men and women to strive to lead more honourable and useful lives. Therefore, seeing what a matter of necessity is a prosperous life to a country, both from a moral and a physical standpoint, it is the bounden duty of those in authority on matters agricultural to spare no pains to promote the "safety, honour, and welfare" of the rural population of Great Britain.'

The Application of Modern Science to the Land—A Crop of Giant Mangolds manured with Sulphate of Ammonia recovered during the Distillation of Cheap Fuel-gas.

FIELD FARMING.

CONCERNING farming in general, reflection will show that in complying with the burning need of decentralization—if this be carried out by means of Garden Cities—great gain would also accrue to Field Agriculture.

Return to the land! that is the admonition involuntarily rising to the lips when contemplating the toilers of our great cities and noting the baleful conditions under which they exist; it were inutile to give it expression, for we know it to be impracticable under existing conditions of our greatest of industries—Agriculture. 'The return to the land,' nevertheless, is both the admonition and the sheet-anchor of these well-meaning, well-doing pioneers of social amelioration who desire to provide non-terrene employment beyond the walls of our overcrowded hives of industry.

At a moment, however, when the decadence of British Agriculture is giving rise to grave fears as to its effect upon our national safety; when, indeed, a Royal Commission is sitting to consider our position in regard to food-supply in time of war, it behoves us to consider if the proposed 'town-country' occupation could not be made to react

beneficially upon ordinary field Agriculture; if, indeed, the expenditure upon Garden Cities throughout our islands would not be more nationally beneficial than that upon vast granaries and storehouses for the produce of other countries.

What, then, is there for us to consider in this relation? There would appear to be but three directions in which we can usefully apply ourselves to work: (*a*) in increasing economy of production; (*b*) in increasing the output of the land under cultivation, and (*c*) in effecting economies in the placing of the commodities upon our markets.

In all of these, reflection will show, Garden Cities should have much to say. The remedial measures applicable to the first and last of these are to be looked for in improved methods of *horseless transport* and *mechanical cultivation*, the second in Technical Education and the application of science to the land. The paramount factor in regard to (*a*) and (*b*) is the ability to place ample manure upon the land at small cost. In this regard the intrinsic value of the material is small; indeed, to-day vast quantities of manure can be obtained for nothing—nay, less than nothing, for in large towns payment is made to those who will take it away. This arises entirely from the present high cost of transport; hence not only is the land more or less starved, but *intensive* culture—required to fulfil the second consideration—is not ventured upon.

As a concrete example, I might take the case of

the land upon which the first Garden City is to be built, and trace what the cost of manure—intrinsically valueless in the Metropolis—becomes by the time it reaches the land. I am enabled to do this through the courtesy of Mr. James Brown, of Baldock.

The contractor who collects the manure in London carts it to the railway-station, places it in the railway-truck, and consigns it to his country customer, charges per ton 2s. 6d.; the railway freightage to Baldock is, per ton, 2s. 5d.; the cartage within a short distance is about 1s. per ton per mile, say 2s.; total, 6s. 11d.

Thus, the cost of manure upon the estate—which is entirely due to transport—is, roughly, 7s. per ton, and this does not include labourer's time in the heaving of it from railway-truck to cart. Added to this, there—very properly—exist rules and regulations preventing the removal of manure, except very early in the morning and very late at night. But Baldock is not a far-removed country place, yet even in this instance the land must, as I have said, be starved, whilst intensive culture is rendered an impossibility. To appreciate this, we have only to consider that the requirement of the land varies from 10 to 20 tons per acre. Now, taking the mean weight necessary—15 tons—we see that for manure alone the cost of raising a crop must needs be £5 5s. per acre—about three times the annual rental.

Here we get a glimpse of the amelioration which the application of modern science could effect. This

transport cost could be reduced to a fraction by mechanical haulage. It also shows us that stable manure, except for purely local use, is an exceedingly inefficient form; it is heavy, bulky, offensive, costly, and its principal utility lies in the heat it imparts. It points to the fact that if, concurrently with the introduction of motor haulage, the number of horses, and *par suite* the quantity available of this material, largely falls off, no harm will result; for, apart from being more scientific, it would be practically effective, more convenient, and more economical to use artificial manures, especially such as are obtained in the supply of cheap fuel-gas to towns.*

To quote Mr. Brown, 'The heavy carriage of manure makes it prohibitive almost beyond two miles from the station, as the cartage is so considerable. Hence, although perhaps some thousands of tons are consigned to Baldock during the season, it supplies a very limited area—some two or three miles around the station. There is no doubt that if motor waggons could be constructed to collect and distribute to the customer direct the thing could be done much more cheaply to the customer, beside which it would extend the area of dumping, as practically the manure could be taken direct to any farm or locality, whether near or far from a railway-station.'

One of the many shortcomings of concentration of population in our great towns is the enormous waste of that natural wealth-producer sewage. The waste

* See Chapter IX.

is not, moreover, confined to the product, vast though it be, for a further and enormous expenditure is entailed in the casting of it away. It is a vast waste of what one might call the double-acting type, for, concurrently with huge payments for the casting away of a valuable entity, other huge payments have to be made in the purchase of imported fertilizers. If now we picture the face of our country becoming o'erspread with towns of moderate size, each engirdled with its agricultural zone, we see at once the practicability of effecting vast economies. The two most formidable *bêtes noires* in the path of the agriculturist are cost of manure and cost of carriage both of this and of the produce of the land upon which it is utilized. It is precisely this trouble in the procuration of manure and its great cost which militates so strongly against the carrying into effect of the intensive form of cultivation so necessary in regard to countries of restricted acreage.

Let us reason it out a little further in regard to Garden Cities of the size it is proposed the first shall be—namely, having as its maximum number of inhabitants a population of some 25,000. The agricultural fringe surrounding them and owned by their communities, whilst being in extent sufficient to supply the needs of their inhabitants as far as vegetables, flowers, fruit, and dairy products are concerned, would yet be totally inadequate to produce the corn and meat necessary for their sustenance. Under existing conditions it requires at least 2 acres

of farm-land per inhabitant to feed our workers, and thus each of such Garden Cities would profitably utilize at least 50,000 acres. Now, the problem of utilizing the natural fertilizer from such a City over the whole area represented by the 50,000 acres would be upon an entirely different footing from that of its useful and profitable disposal from towns inhabited by millions over an area of proportionately greater extent. Hence is paved the way for more rapid and intensified culture, but the latter means, at the same time, augmentation of the labour-supporting capacity of the land. Agriculture at present suffers from dearth of labour, whilst our cities are overcrowded by it, the reason being explained by the fact that the land at present finds the payment of a higher rate of wages a burthen greater than it can bear. But the condition is altered by the degree of cultivation. Hence we are justified in saying that the establishment of these Cities will in a great measure solve the agricultural problem. They will afford the means of bringing back to the land men who have sought employment in urban industries, and hence there will grow up and spread over the face of our country a new race, having their occupation in the open air, of improved health and physique and of more sturdy constitution, fitting representatives of their yeoman progenitors.

The great question, of course, is, Can farms be cultivated in such a manner that the wages paid shall be so raised as to offer such inducement that it shall

The Application of Modern Science to the Land—a Field of Oats nearly 5 Feet High and a Potato Field manured with Sulphate of Ammonia recovered during the Distillation of Cheap Fuel-gas.

overcomé the, at present, preponderating pull towards towns? The answer is easily found if we look back and consider the wages formerly paid to many of the workers in our staple industries when these were in their infancy, as compared with those earned by the skilled operative from the same source to-day. All that is needed is that agriculture should be carried on in the same scientific manner as are all other great industries abroad and many of our own, so that farm labour shall become skilled labour, the results attained made commensurate with the work entailed, and the rate of wage made proportionate to such skill as obtains in other branches of industry. Our farmers are too prone to the *laissez faire*, to grumble and deplore that this or that crop fails them. Had this been the policy of our competitors, they would not to-day have been fulfilling the demands of our country instead of our own farmers—a deplorable fact so eloquently proved by the statistics to which I have had occasion to draw the reader's attention.

What would be thought of the manufacturer who, because a certain pattern or article failed to sell, sat down and moaned while he waited for the times to come back to the old ways? Nought but extinction of his industry, a process already partly carried out in regard to our agriculture. Other countries are flooding this one with their dairy produce, their poultry, and their root and green vegetable crops. Whilst our farmers sigh over their diminishing profits

from cereals, more and more land goes out of cultivation year by year, and we, as a nation, are subjected to immense loss by reason of the unproductiveness of a rich soil.

Much that should be otherwise is doubtless due to want of thought and reflection. At first thought, perhaps, the shortage in the home supply of poultry and eggs might be thought a somewhat trivial matter, and not one of national importance. Yet, when we come to consider it, we see that our farmers are allowing to lie fallow—a mine of wealth, for their neglect costs us over *six millions sterling.* It is obviously idle for British agriculturalists to cry out against the depression which has fallen upon their industry, if they do not take advantage of every opportunity that offers itself of adapting their methods to the altered requirements of the times. The strenuous efforts which have been made of late by the National Poultry Organization Society to increase and systematize the supply of poultry and eggs, we trust may not be without good results in impressing upon our farmers the magnitude of a *primâ facie* small matter, and enable them to largely profit by it.

Elsewhere I have referred at some length to dairying, and have drawn attention to the great strides recently made by well-directed energy in Ireland. I have also drawn particular attention to the immense national importance of sugar manufacture; here are two things that would handsomely repay the farmer to carefully study.

Corn-growing, we are told, has gone from bad to worse and worse year by year, until it no longer repays for the labour expended on the production of the grain. It has therefore, as we have seen, been largely abandoned—under existing conditions an inevitable result. Hence a larger and yet larger portion of the country has been put down into permanent pasture. Such grass-land is now used to a too great extent for the production of meat, seeing that it would be wiser first to fulfil our own dairy produce requirements, and to look to our colonies to fill the increase of shortage in cattle-breeding. In this connection, again, we would do well to ask ourselves if we are obtaining best results and the maximum yield from our pasture-land. It has been estimated that it requires from two to three acres of such pasture to feed an ox for a year. Hence, allowing one ox as the animal food for every three persons in the country—a very fair average—we find that our 32,526,000 inhabitants would require the same number of acres for the raising of their beef alone, whereas the total cultivated area of Great Britain is only some thirty-two and three-quarter million acres, half of which is permanent pasture, and the other half cultivated land proper, including in this head land under rotation of grasses and that cropped for hay.

Is this a parallel condition with other countries? If we turn to Belgium we find that one and a third persons per acre are supported entirely on the

agricultural products of their own country, irrespective of their exports (*amounting to more than a million pounds sterling*) of such products to this and other countries; Belgium, be it remembered, being a country having a much larger export of manufactured goods per head of population than our own.

	Crop per Acre in Pounds.	Equivalent in Dry Hay in Pounds.	Number of Cattle fed from every 100 Acres per Year.
Pasture	—	1,200	13
Unirrigated meadows	—	2,400	26
Clover cut twice ...	—	4,800	52
Swedish turnips ...	38,500	10,000	108
Rye grass	64,000	18,000	180
Beet (intensive culture)	64,000	21,000	216
Indian corn ensilage...	120,000	30,000	330

One is justified in asking how this fine result is brought about. The answer given by the Belgian farmers is that they are compelled continually to study how to make the land yield larger crops, and that in regard to cattle-rearing they have succeeded by *substituting a cultivated feed* in place of *permanent pasture*. The effect of scientific treatment in this connection is truly astonishing. This is clearly demonstrated by the work of a celebrated French writer on agriculture. He assumes that 9,000 pounds of dry hay are necessary per head of horned cattle per annum, and by the above table shows the rearing capacity of the land by the substitution of 'cultivated feed.'

From the table given we are able to appreciate the enormously favourable reversal that is made to take place, for from the two to three acres allowed by us per head of cattle, it is possible to reverse the figures and so reduce the area necessary that *each acre suffices for the rearing of three head of cattle.*

If we turn to France or to Italy we shall find similar triumphs have to be recorded in regard to cattle-feeding by recourse being had to 'irrigated meadows.' The system was first adopted in the Vosges district, and it was found that the crop of hay rose from an average of $1\frac{3}{4}$ tons per acre to *six tons per acre.* The value of the experiment being appreciated, it spread, between the years 1862 to 1882, over nearly the whole of France. By this means land increased in value as much as five times in some districts, and the system became extended to corn and root-growing land as well as to market-gardens. In Italy, around Milano, some 22,000 acres are irrigated from water derived from the sewers of the City; here 8 to 10 tons of hay per acre represents the average crop, and on certain meadows as much as 18 tons per acre have been obtained.

In the foregoing pages I have referred to a specific farming operation—that of the cultivation of the sugar beet—which, if properly followed up and worked in conjunction with the cognate industry also touched upon, is destined to fulfil a rôle of the greatest importance and of wide-spreading influence

and prosperity throughout our islands. It is therefore pleasing to find that most gratifying results in respect to it have already been obtained through the instrumentality of sewage irrigation.

As to the second direction,* it would be presumptive in me to enter upon *practical* details of agriculture having for their object the amelioration of the lot of the British farmer, being neither an agriculturalist nor practical horticulturist; but I feel, even were I either, I should still hardly be the proper person to deliver a dissertation upon the subject, from the fact—only too true—that our farmers and vegetative culturists—I use not the adjective ironically—have been slow to adapt and apply science to their calling—nay, as a whole English farmers refuse to appreciate the benefits science can confer.

This, in relation to our good-natured, open-handed, frank-hearted, more-sport-than-science farmers—descendants of the sturdy rule-o'-thumb British yeoman—is easily to be understood, and even appreciated; but, unhappily, they have neglected two other things: they have neglected to acquaint themselves with the conditions under which their own calling is carried on by their competitors—the foreigners—as the more enlightened of manufacturers have done; moreover, they have failed to make up their own minds as to what they really do want as a mode of self-betterment. Though this be so in regard to the

* See p. 1264.

fathers of our present generation, it should not obtain in regard to their sons; and doubtless an explanation of the extraordinary rapidity with which the aid of science has been invoked, and benefits realized from it in America and Canada, is to be found in the fact that agricultural destinies there rest so largely in the hands of younger men.

To all, however, who may not be of the jocund fraternity of the *genus* farmer, who are quite untrammelled by time-honoured practice, and who can therefore survey the important problem in a broad, comprehensive, and international manner, it is abundantly clear that our policy—one which has resulted in the continuous decline of our most ancient industry—cannot be continued. That want of success is, in a large measure, attributable to the happy-go-lucky and *laissez faire* temperament of the English farmer is conclusively proved by the fact that the 'longer-headed' Scottish agriculturalist finds it possible to 'come South,' and to take the farm—erstwhile the ruination of his predecessor—and thereon find a competency.

It has been urged, and, I think, most rightly, that the excessive conservatism of the British farmer might be breached if, as in our progressive Dominion of Canada, information for their guidance were conveyed to them *gratis*. In Canada such a course has been found to constitute a paying investment, and there we find the farmers officially furnished with the full literature of the latest dis-

coveries and all the recent advances made to accrue from the application of science to the land. Western Australia is the latest to realize the great value of science as applied to agriculture, and has recently sent to England to find a man to fill the new position of Director of Agriculture, with the significant rider that, if he be not to be found among us, he is to be procured from the United States. So perfect is the working of the agricultural intelligence system and the technical instruction bureau of the Americans, and so gratifying is it to find our children—neighbours of the enterprising workers just referred to—striving to keep pace with them—indeed, it is a question if the world can show a finer object-lesson than their Ottawa Model Farm—that I have felt it might prove of some value to give particulars of the systems—which I am enabled to do by the courtesy of the authorities—in an appendix to this chapter. It may be interesting to add that the students trained in our agricultural colleges at home have been able to make Canadian land pay handsomely.

The result of all this has been, and would be with us, a gratifying fulfilment of the second condition I have put forward; and with these remarks I must leave it in the hands of men qualified to bring the benefits to our own doors.

That steps of some sort, probably legislative, administrative and educational, to bring to the land the benefits of science—a course that has proved a

boon and blessing to other countries—must be taken to prevent our land going entirely out of cultivation is clear, and the less the loss of time, the easier will be the task. To us, so accustomed are we to reliance upon individual effort, it seems strange to contemplate State advice and organized assistance. But, all the same, it is clear that, in regard to agriculture more than any other industry, combined action is frequently not only advisable, but necessary—such action as can only be set in operation by a central authority. I feel considerable advance in this direction was made when we came to see that a Ministry of Agriculture was a necessity, and it is gratifying to feel that a more able administrator of the powers vested in the department could not be found than our present Minister of Agriculture. Take a simple case by way of example—the extermination of pests. Of what avail would the greatest enterprise upon the part of a single individual be? Yet if a British Government were asked for a substantial vote for the carrying out of a scientific process to such end, its feelings would be shaken by stupefying surprise. We find, however, in France a Bill drafted allocating the sum of £14,000 for the purpose of carrying into effect the result of experiments made in the Charente district, where it has been found that a certain culture of microbes is deadly to field vermin, such as rats and mice. The credit asked for is to be devoted to sowing these microbes in infested

areas by means of small cubes of bread impregnated with the culture.*

That we do not do such things is simply because we have not commenced to accustom ourselves to getting out of difficulties by calling to our aid the dictates of science; more especially is this the case in regard to the State. As a cognate matter undertaken by private and corporation enterprise, one might refer to the bacteriological process of sewage purification. In this connection the microscopic microbe may be put to such useful effect as to save our inland towns millions of capital expenditure, and tens of thousands of pounds annually of current expenditure. The extraordinary results of recent investigations, by which it has been proved that it is absolutely necessary for the maintenance of animal life that certain species of microbes be partaken with the food, appears to be a stepping-stone towards the converse application of science—namely, the sowing of the land with life-sustaining, instead of life-destroying, bacilli.

What science may be made to achieve in regard to our crops is only just beginning to be learnt and appreciated. Take, for example, the scientific return to the land of the nutrient principles extracted from

* For house rodents another method has been hit upon. Quicklime, after being powdered, is mixed with sugar, and the vermin greedily devour the mixture. The gastric fluids then convert the lime into a hydrate, developing in the process the heat which is fatal.

it as the price of its co-operation in reproduction. Professor Wagner, of Darmstadt, claims that scientific manuring will give positively amazing results. According to Mr. Rider Haggard, the average yield of wheat on English soil in ten years' crops is 16 cwt. per acre; the German experiments give 32 cwt. Barley gives 15 cwt. in this country, as compared with 30; oats 14, as compared with 32; clover hay 31, as compared with 120; mangolds 350, as compared with 800; and potatoes 95, as compared with 400. And these are not merely experimental comparisons, for a farm of poor and stony ground, which had previously ruined several people who had attempted to cultivate it, has under the Wagner system of manuring and tillage yielded £700 a year profit, and many of the crops which at one time could not be grown on it now give even better results than those at the experimental station, and twice, and in some cases several times, more than the averages obtained on the old English system of farming.

We need not go to Germany for proof of this fact, for there are farms at home which demonstrate it. But we still buy for our land a relatively small quantity of artificial manures as compared with the investment of German farmers in these fertilizers. In Germany the consumption of artificial manures has trebled in little more than twenty years; and the striking fact remains that whereas the yield per acre in England is set at £2 10s. 3d., in Germany it

is £5 15s. Scientists maintain that low prices are not so much the cause of depression in our agriculture as bad crops, and that the remedy lies in obtaining larger crops without increasing the cost of production.

We see, then, that the haphazard methods of the old-fashioned farmer are fatal to prosperity. His crops could be enormously increased without a proportionate increase in the cost were he only to proceed in the right way. When Sir Joshua Reynolds was asked, 'With what do you mix your pigments to produce such exquisite colour effects?' his answer was, 'I mix them with my brains!' And it has now become necessary that the land should be tilled with brains.

A perusal of the foregoing chapter will, I trust, serve to indicate what science has done for the Danish dairy industries; but still, they do not rest upon their oars, nor gaze with satiated satisfaction upon their laurels. Experiments are being incessantly tried; it is striven to make advance lead to further advance. For example, Herr Hegelund, an official of the milk industry department, has quite recently shown that a cow can be made to yield double the quantity of milk by milking it eight instead of three times a day. Moreover, when the cow has been used to the change for some three weeks, it continues to give an increase of milk, although there is a return to the earlier practice of milking thrice a day. Frequent milking is only what the cow experiences with her calf. There is

also, it may be added, an improved method of milking by hand taught at the milking-school of Ladelund, in Denmark.

In regard to the third direction,* I venture to suggest that it is to the engineer that not alone the farmer, but the market-gardener and the factory proprietor of Garden Cities, must look for means to effect economies, and to afford fresh facilities by means of their mechanical innovations.

When the transition was taking place from the pack-horse as a mode of travel and transport to that by means of wheeled conveyances, wild and vehement were the outcries and efforts of opposition, on the plea that it would ruin the breed of saddle-horses, make men effeminate, and greatly *reduce the number of horses required.* At a later date, when wheeled vehicles were becoming common, the purport of the outcries was reversed, and an Act of Parliament was actually passed to prevent their general adoption, lest the *increasing* number of horses required should consume the food of the poor. Of the two conditions assumed to have obtained, I feel that the second most nearly resembles that of the farmer of to-day. Although the food of the horse is no longer the food of the poor, yet the food of the horse used in agricultural operations bears an all too high ratio to the total quantity raised upon the farm, for the acreage under cultivation of horse-food cannot be productive of man-food. Added

* See p. 1264.

to this, the agriculturist suffers under the dual disadvantage of excessive cost of transport of both his requirements and his produce, and the fact that his horses, which should be expending the energy of the fuel consumed—corn eaten—upon farming operations, are wasting it to useful effect—from the point of view of cultivation—by being employed as animal locomotives in the transport of produce to market, a mechanical operation which could be effected by means of a fuel much less costly.

'Every farmer his own light railway' is a suggestion which has already been made by those who can see the future before mechanical road locomotion; but in my opinion it is an idea more perfect in theory than in practice, although not impracticable. Its fulfilment, however, would only meet difficulties halfway. The *bête noire* of the farmer is the cost of getting his produce to market, but I feel that this *bête* in his path might not only be removed, and he be left entirely free to devote the whole of his plant, live and dead, to production, but that it is an enterprise into which the farm landlords and others might remuneratively and safely embark capital. My suggestion is that small local companies, preferably of the landlords, should be formed to act as produce collection and material delivery companies; that the central stations or headquarters of such companies should be towns served by railways whose directors are the more amenable to reason and negotiation in the matter of rates of freight; and that such local

companies should collect from the farmers their produce, transport it to such headquarters, and entrain it at certain fixed rates; and, moreover, detrain, transport, and deliver such material as the farmer requires upon his land. I further suggest that such should be carried out in a business-like and engineering-like manner, by which means the cost would be reduced to such an extent that it would be utterly impossible for light railways (if they ever be largely constructed) to successfully compete.

I would employ a special plant, which would consist somewhat of the following: An automotive waggon, capable of carrying within itself goods, its motor being of suitable power to transport by haulage goods contained in road trucks drawn by it. The haulage by means of special road waggons, strong and light, of tubulous steel build, of uniform dimensions, and so constructed that their bodies could easily be detached from their under-frames. The motor waggon would act the dual part of the traction engine and crane, for which purpose it would be provided with suitable gear. The plant of the company would be worked somewhat in the following manner: The motor waggons and most of the road waggons being at the central station, work would commence in the morning by unloading the goods which had arrived by rail during the night. For this purpose mechanical power would be employed as much as may be, and the goods so unloaded would be hauled by the motor waggon and

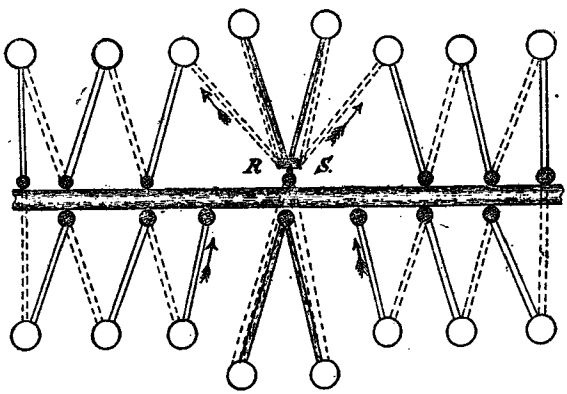
delivered to the farmers, the road waggons being left as required at the several farms. These would be loaded by the farmers during the day, and the motor waggon, on its return in the evening, would collect and haul them full of produce to the railway-station. Here the crane upon the tractor waggon would be brought into operation, and the laden *bodies* of the road waggons lifted and deposited in the railway-trucks, their dimensions being such that this could conveniently be done with the ordinary standard railway-truck. Many of these bodies would be returned laden with 'empties.'

It is regrettable that, through lack of adequate perspicacity, the canals of this country have been permitted to become largely absorbed into the railway systems; whereby beneficial competition in regard to agricultural produce has been stifled. For it must be remembered that there is no form of goods transport so economical as that of water carriage. In all cases, therefore, where rivers and canals are available, water should be made use of as the vehicle of heavy-tonnage and long-journey transport, leaving to the road locomotive the primary duty of collection.

In the diagram is shown the system I ventured to put forward for embodiment in the splendid scheme for the amelioration of agricultural depression in Ireland inaugurated by Lord Iveagh and the Hon. Mr. Pirrie.

The diagram illustrates my suggestion for a *weekly* road-haulage-canal service over a district one hundred miles long

by fifty miles broad, affording a *daily* delivery to a large town or seaport, by means of three road trains, each of which would work twelve days and then go into the running-shed (RS) for two days. The produce would not be handled in transit, this being obviated in a similar manner to that just described in connection with farm collection by the use of movable bodies upon the road-train 'trailers,' such bodies being transferred to the canal 'flats' or river barges by inexpensive shears—capable of being



worked by one man—at the canal-side. Loose and small-parcel goods would be carried upon the tractors, produce in bulk upon the trailers. The tug-boats would be propelled by oil motors, and would carry loose goods, each towed barge carrying two 'bodies' for produce. By such a service a weekly collection would be made from *fourteen* towns or collection centres, situated at an average distance of twenty-five miles on either side of the canal, and *fourteen* riverside centres.

The dotted lines show weekly deliveries of material *to* the farmers, etc., the full lines weekly collections *from* the farmers, etc.

From mechanical transport to mechanical cultivation the transition is simple and natural. I must not, however, dwell upon the latter important subject

any more than to say that we are at this moment upon the eve of great change in this respect. The employment of motive power in agriculture has, so far, resolved itself principally into steam-threshing and steam-ploughing and the haulage of huge 'cultivators' to and fro across large expanses of arable land; each plough or cultivator with its engines and adjuncts being worth hundreds, or, it may be, exceeding a thousand pounds. Such automatic implements, it is obvious, are applicable only to farming operations upon the large scale, whilst their cost puts them out of the scope of employment by agriculturalists farming anything but abnormal areas of land.

The invention of internal combustion, liquid fuel motors, by Daimler and Benz, and the very rapid development which has taken place in them as a consequence of their adaptation to light road locomotion and transport, has now put it within the reach of agriculturalists to have by them at all times an instantly available source of cheap and convenient motive power which can be utilized in an endless variety of ways as a labour-saving expedient in fulfilment of requirements, varying from hundreds of horse-power down to that equivalent to but two or three man-power. In this we can perceive the beginnings of a revolution in mechanico-agricultural methods.

Apart from the paramount importance of cheap and convenient motive power for the numerous

labour-absorbing operations of the homestead, one might take in exemplification almost any operation of field agriculture. At present these are not only intermittent,* but necessarily slow. Horses have their set, leisurely and extremely slow rate of progression—about two miles per hour. Any attempt to increase this with animal motors would result in rapid exhaustion, with resultant loss far outweighing the gain due to time. The agriculturalist has also to be considered. A day's shooting over ploughed land serves to impress upon us the arduous nature of the ploughman's task. Acceleration on his part also is an impossibility. With mechanical motor cultivation, on the other hand, the 'labourer' rides upon the auto-propelling cultivator, and his task is thereby materially lightened. But by means of mechanical propulsion and traction we at once see our way to acceleration in the speed of cultivation. In that case

* Since my remarks anent this were written (see p. 1217), I have been informed that in the United States the point has been appreciated, and continuous motion has in some cases been adopted. In Kansas, for example, a row of corn in circular form was planted this spring twenty-five miles in length. Commencing at the margin of a fifty-acre field, the cultivator went round and round in a circle, until he had planted the whole area in a single row, the ploughing having been previously accomplished in a similar manner. A disadvantage of to-and-fro ploughing is the production of unevenness of the ground. At each end of the field, in course of time, a bank—locally called a balk—is formed, sometimes 3 or 4 feet high, brought about principally from the cleaning of the ploughshare during the periods of rest.

increase in horse-power means but a slight increase in diameter of the motor cylinders, whereas in animal cultivation it would mean an increase in the number of horses quite unattainable in practice. It is as yet too early to refer to actual figures in proof of the advantages of motor culture, but it may be stated, as a point of interest, that last harvest an agricultural petrol motor, dragging an ordinary reaper and binder, reaped 19 acres of wheat in ten hours, at a cost of less than two shillings per acre.* Rapid progress is now being made in adapting cheap motors for use with ordinary common (paraffin) oil as fuel, and hence very shortly such running expenses will again be materially reduced. A most valuable feature of motor cultivation, I might here impress upon the reader, is that the expenditure is directly proportional to the work done, and that *no expense is incurred* while work is *not* being done. With horse cultivation, on the other hand, expense is incessant. Sunday and week-day, night and day, as it were, fuel is always being consumed, as represented by the feed of the animals. The reader will also readily perceive that the cost and labour in and about the farm in raising the food for the animal motors, and in its transportation, is far and away in excess of that of the purchase and transport of a few gallons of petroleum.†

* In a recent competition a petrol plough took the gold medal against 130 horse competitors. It ploughed 8 acres of land at a cost of 16s. for petrol and labour as against £4 for horse-ploughing.

† In our last South African campaign, during which cavalry

Concurrently with this we observe considerable attention being paid to the question of 'small holdings.' Herein presents itself a state of things demanding most careful and serious consideration; for whilst the evidence in favour of the value of scientific methods and mechanical cultivation—such as 'deep ploughing'—is overwhelming, we also have presented proofs of the value of 'spade' culture and closer attention, such as can the more effectively be given on 'small holdings,' the result in both cases being a gratifying increase in the output of the land.

Now, *ex necessitate rei*, the two things cannot be combined. Not only from considerations of capital expenditure, but from the general and inherent conditions respectively obtaining. It matters not by what means 'higher' cultivation may be brought about: if the land can be made to support in comfort and content-imparting prosperity a greater agricultural population, the gain is a national one. There is a considerable measure of sentiment involved in the holding of land. The possession of but a modicum of the soil confers a certain status not possessed by

had to be extensively employed, it was found that, of the immense weight of commissiariat stores necessary to be dragged forward with the army, no less than about 80 per cent. of the weight—and a greater ratio of proportionate bulk—was that represented by the fodder for the horses, so that Lord Roberts became deeply impressed with the utility and efficiency in this respect of the steam traction transport trains, with the result that since the war active attention has been paid to this department of the Army Transport Service.

the 'landless man'; whilst—as I trust I may have shown in regard to allotments—it is conceded that in many cases the incentive to put labour into the land on the part of the small holder is such as to cause the owner to be almost incessantly at work upon it. Where is the visitor to Switzerland who has ever succeeded in rising sufficiently early to see the pigmy patches of tilled soil without their owners labouring upon them? Even before the curtain of night has been raised will the industrious Switzer small-holding landlord be seen, and it is to this large entry in the labour account that the large output can be credited.

All would wish to see a far larger proportion of our working population, not only landlords of their own dwellings, but also owners of the land they till. In the foregoing pages I have sought to direct attention to means of bringing about workman house-owning, and in that relation the good effect and value to the individual is indisputable. I do not, however, feel that the same has, in any measure, been shown to hold good in regard to small proprietorship of the soil. The question we have to ask ourselves is, whether a man possessed of a small capital is well advised in putting it into land?—even if he works that particular plot of soil. The wealthy man finds land an extremely bad investment: why should a poor man find it a good one? Large landed proprietors in this country know to their cost that land does not yield them

more than *two per cent.* for the money invested in it. Is it wise for the man of very limited means to invest his capital in this way, and to obtain from it the meagre return of a couple of pounds per cent. ? The tenant farmer who becomes a landlord on this purchasable basis locks up his capital for the two or three per cent. return, whereas by remaining the tenant, with a reasonable rent, he is free to utilize his capital towards the improvement of his stock, and to purchase modern implements and machinery, which will insure the higher — and consequently greater profit-returning — cultivation of the land. By the latter means he may readily obtain a trading rate of interest double or treble that he would obtain with his capital locked up in the land. Debts, taxes, and encumbrances of various sorts, will be soon found attendant upon proprietorship, far outweighing the rental of the land, and at the same time preventing him from having a margin of money for trading purposes.* The subject of small holdings, I submit, is one of great importance and much interest ; but it is an entirely undecided one as to its intrinsic value. It is a question closely watched by the present Minister of Agriculture, who obviously, whilst preserving an entirely open

* The *free* homesteads of farmers in most of the States of America, one is informed, are rapidly becoming mortgaged, whereby a spectral and tyrannical landlord is virtually brought into being in the shape of a six or seven per cent. mortgage interest.

mind, has yet no settled convictions upon the matter; for we find him mentioning—whilst confessing that so far as his experience went of those parts of the country he has so far visited where small holdings are in operation, he would be prepared to accept the statement that they were successful—that he had noted that in all cases where he had seen them they had been situated in exceptionally favourable circumstances. Either there had been a propinquity to a great market, or there had been a special kind of soil eminently suited to the particular requirements of market-gardeners. On the other hand, Professor Long claims that in all cases they have proved successful. (The Small Holdings Association, Ltd., of Newdigate, Surrey, may, it is said, be cited as an example.) On the point of *success*, however, Lord Onslow emphasized that what it was desired to know was whether any of the holders lived *entirely* out of the proceeds of their holdings, because that was the most important point. It was not a question whether the Government could provide people with small holdings by which they could add to their incomes, but whether they could offer the labourer in the country in the middle or at the close of his career an opportunity of purchasing by instalments a piece of land which he could cultivate himself, and out of which he and his family could make a living. If they had solved that problem, they had solved the problem of what was commonly called 'back to the land.' He was only too anxious

to be convinced that that problem could and had been solved, because he was quite certain if it could be demonstrated that the problem was not insoluble it would be the duty of the present Government—or any Government—to give it all the assistance in its power to obviate an undoubted evil—namely, the deterioration of the population by the manner in which the country population was flocking into the town. He further pointed out that it represented a very serious diminution in the available employment for labour that permanent pasture should be increased by $3\frac{1}{2}$ million acres, while the land under the plough, which created the more labour, should have decreased by $2\frac{1}{2}$ millions in the same period. That undoubtedly was a serious matter, and it was to remove that evil that their whole energies should be directed.

If small holdings pay, it is obvious it can only be due to the increase of individual labour expended upon the land; but this labour would be lessened and the returns greatly increased if arrangements could be made that mechanical methods and labour-saving appliances could be made available for small holdings, as can be done in regard to farming on the large scale. How can this be brought about? That is the next matter of paramount importance. *Primâ facie*, it might be thought—especially having regard to what I have ventured to bring forward in relation to co-operative dairy-farming in Denmark and Ireland—that in co-operation would be found

the '*open sesame*' of small-holding prosperity. That the system carries upon its face the imprint of great potence and large future scope cannot be gainsaid, but I feel the particular form of co-operation is the point which should command much careful thought.

We may dismiss at once, as being beneath contempt, puerile, and as having been entirely put out of consideration as an effective remedial measure, the socialistic panacea to be found in 'free land.' In a recent agricultural conference it was proved that, in many instances, and notably in the county of Essex, *rent* did not enter into the calculations at all, for many tenants *paid no rent*, and, indeed, instances were on record in which landlords were five shillings per acre out of pocket. It is therefore a pity to waste time in listening to arguments relating to such fallacious, ill-launched and utterly impracticable notions. At the epoch at which we have now arrived in regard to industrial and agricultural reproduction, it is axiomatic that the capitalist can never be eliminated from any sphere of reproduction. Although some appear to think so, co-operation has no eliminative effect, for it is obvious that every shareholder in a mutual benefit society, every member of a co-operative institution, and every partner in a concern, no matter how small, is *per se* a capitalist. On a man becoming the owner of a small holding, or seized of a patch of land, he becomes constituted a landlord, hence also he becomes a capitalist; he becomes the possessor

of a negotiable instrument which he can sell, transfer, or mortgage. Therefore it is clear there cannot be any industrio-commercial co-operation without at the same time co-operation of labour and capital. Moreover—and this is the important point—no industrio-commercial co-operation can be of material value unless it be so constituted that it can admit of, and by its integrity command the inclusion of, extraneous capital. Therefore we come to the situation I have more than once pointed out, wherein much valuable assistance may be made to accrue from the utilization of such extraneous or sleeping-partner investment (see provision for old age, etc., in Chapter V.). But in the case of landlord and tenant the landlord is usually the larger capitalist, almost invariably so in the case of agricultural land. Now, who could possibly be better suited to play the part of the extraneous investor than the landlord? Why, then, should any co-operation be necessary, or likely to prove more beneficial than that which ought to be so easily brought about by co-mingling the interests of landlord and tenant? Co-operation is synonymous with profit-sharing, and profit-sharing in this relation would be equivalent to prosperity-sharing. At present there is nothing of the kind as between tenant and landlord. Yet what is urgently required is the co-operation of all classes interested in agriculture. A change is called for, in the interest of all, by which the labourer, the farmer, and the land-

lord could each feel that they had one common interest, and that that interest was not only individual and joint profit-making, but the revival of the ancient staple industry—the wet-nurse of every other industry, as Thiers put it—and the revivifying of the prosperity of British agriculture.

This feeling and this effort, it appears to me, could be brought about if a system of profit-sharing could be devised to operate as between landlord and tenant. Salvation and amelioration of the present state of things can only be sought in intensifying agriculture. But intensive culture, as I have shown elsewhere (see Chapter IX.), requires the setting aside of a far larger amount of capital per acre. To raise that increase of capital by mortgage is to court disaster; moreover, our laws relating to tenure are capable of—indeed, I would venture to say *demand*—improvement. Once let landlord and tenant become partners, and troubles and difficulties arising from this source at once disappear. Then as to capital. In relation to depression in agriculture, people are in the habit of extending their sympathies only to the labourers upon the land; they apparently never stop to reflect upon the distress which the fall in land values has occasioned, what changes it has wrought in many thousands of homes, and hence it is easier to suggest light-heartedly that the landlords should find the capital than for them to comply. But, happily, a certain number of the 'useless units'

(*sic*) are engaged in urban businesses, or have by the exercise of thrift—for it is not usual for middle-class workers to spend up to the last pound of their income each quarter, as it is the practice of industrial workers to spend, not only up to their last penny each week, but, moreover, to anticipate their earnings for the next—been able to make town investments, and hence complete disaster has been averted. Indeed, the peculiar state of things presents itself to-day of men working and earning incomes in towns, and spending much of such earnings as owners of land in the country —of capitalists drawing incomes from their town land, and absorbing it upon their country land. Indeed, it has been put facetiously, but with truth, that only the wealthy can afford to own land. In this relation it is observable that rich men deriving their incomes from mercantile pursuits have within the last year or two bought large tracts of land avowedly for use as 'playgrounds,' knowing that the possession of such land will result in outgoings, and not incomes. But these playgrounds will entail the employment of a larger number of workers in ministering to 'sport' than the land could otherwise support, so that such units are not so utterly 'useless' as your socialist would have us believe.

There are, happily, a goodly number of landlords in position to join their tenants and to find the capital for intensive culture : can there not be

thought out an effective and pleasantly workable system of co-operation? The matter is certainly worthy of most careful study. What occurs to one is that the landlord might let his land to his farmer tenant at a minimum rate (say, such as to return him only two per cent. interest), and provide the requisite plant and machinery on the arrangement that his share of the joint profits shall be just sufficient to cover a fair percentage for depreciation, and give him a return of, say, five per cent. upon his money invested in land and plant, the balance of all profits earned being payable to the tenant. Such an arrangement presupposes a considerable measure of confidence on the part of the landlord in his tenant, but, then, all co-operation is based upon mutual confidence. In the case of landlord and tenant having pleasantly and successfully worked out a lease upon some such co-operative principle, one could even conceive them entering upon another in which no rental was payable, and with a re-arrangement as to profit, with this great advantage, that whereas in prosperous years the landlord would find himself become a prosperity-sharing partner, the anxieties of the tenant would be greatly lessened, for—whilst appreciating this as being a perfectly fair and equitable arrangement—he would have the satisfaction of knowing that in 'hard times' he would have no rent to pay. This, I repeat, would require confidence, but confidence is easy enough to establish when master and tenant

are in touch; and with regard to rural pursuits, it is pleasantly noticeable that, as between master and operative, a far greater measure of mutual respect obtains than unhappily presents itself as between master and man in urban industry—a matter I have touched upon at greater length in Chapter V.

I have here taken the case of co-operative relationship between a landlord and single tenant, the primary object being the ability to carry higher culture to the land. But it is easy to see that its value would be enhanced in the case of a number of tenants combining with their landlord. In that case the tenants themselves could make use of *joint capital* to far better effect than individual capital and individual plant. Much mechanical help and many labour-saving appliances could be properly provided for *joint use* upon the *extended acreage*, such as would be financially impracticable and quite inconsistent with the working of the small individual areas. Such a system of co-operation would embody all the advantages which have served to bring success to Irish co-operative dairy-farming, with which I have dealt in a previous chapter, the extraneous capital in this case being put in by a deeply interested party—the landlord.

The foregoing, I feel, abundantly shows the scope that exists in regard to the advancement of our ancient and once flourishing agricultural industry, which, from the figures concerning international trading I have brought forward, one sees is capable

of enlargement—to individual as well as to national advantage—in so vast a degree.

I have dwelt thus much upon the subject of agriculture, and have quoted many exceedingly interesting figures, with the object of impressing upon the reader the vast potentialities of Garden Cities in regard to the economics of national wealth production, for it is clear that by means of decentralization and the overspreading of the country with towns of moderate size, each separated from the other by an appropriate extent of agricultural land, the requirements of natural law involving the complete utilization of excrement in regeneration could be complied with. This would be accompanied, not only with vast national economy due to the process *per se*, but would enormously increase the acquisition of national wealth by means of the increase of productiveness of the land. To compass this end, moreover, the most potent factor is the intelligent application of science—both mechanical and chemical—to the land. But science can only be carried to the land by apposite technical training, and this is most valuable when locally imparted; hence in this, also, the power of decentralized communities should be great. But increase of productiveness is synonymous with increase of employment of land-workers, and hence represents another great source of natural wealth by the utilization instead of forfeiture, by emigration, of the work-worth of the human units produced, and maintainable, by the cultivation of the soil.

1300 B

Light Hand-driven Cultivators.

APPENDIX I. TO CHAPTER VIII.

NOTES ON INTENSIVE CULTURE.

LAND which, under ordinary cultivation, cannot be made to pay for its working, can, it has been shown, be made to pay handsomely by means of 'intensive culture.' But the contrast between the normal output and the intensified output is probably not appreciated in anything like its true significance. It may, therefore, not be without utility to refer to the important matter.

There are no cultivators who have so successfully dealt with the problem of producing the largest crop from the smallest area as the French *maraîcher*, or market-gardener, especially those in the vicinity of Paris. Ordinary cultivation has become a matter quite beneath his notice. From cultivating the natural land, he has long since passed to the employment of artificial soil, making, indeed, this the vehicle best adapted to the cultivation of his specific crops. Barren, stony districts, even disused quarries, under his guidance have become fruitful land. He is never afraid of a glut of any one crop, for when he has supplied to the utmost extent the demands of his own town, he packs up his surplus, and sends it to the London market, well knowing that his goods will there find a ready sale and a profitable return.

Let us consider how it is he is enabled to do this. The Continental gardener went first of all close to the towns, because he could there procure cheaply immense quantities of stable manure. This he employed to warm up his soil, and thereby produce his vegetables somewhat earlier than by ordinary cultiva-

tion. This, moreover, meant quicker growth, and consequently a larger number of crops in the year. But nearness to the town, on the other hand, also meant great increase in rent; it became, therefore, necessary to produce these crops both in greater frequency and with the largest possible output for a given area of land occupied. To effect this the fecundity of the land must be greatly increased, and it may be said of these cultivators there exists no unfertile soil; they made their soil, indeed, as they required it. Every spot within quick reach of the town was seized. The sides of the disused stone quarries around Paris are now all gardens, teeming with vegetable crops, whilst the dark, damp, underground parts produce tons of mushrooms, which are sent all over France, England, and Germany. The making of prolific soil, indeed, became a recognised thing to such a degree that the gardener, when moving, is allowed by the terms of his tenure to cart it away with him to a certain depth, as part of his cultivative plant, like his tools, frames, and other implements of his calling.

As he progressed in the application of science to culture, he found better means were available for warming his land than the time-honoured method of using manure; for we find he now puts down a series of earthenware hot-water pipes in his fields, and thus warms the land to the desired degree.

In intensive culture every plant has its own apportioned share of care and labour. Seeds are not planted in the open, but in boxes on a hot-bed under a frame; the seedlings are transplanted into rich loam under other frames, and finally put out to mature in the open garden ground. The ground cultivated is never allowed to lie idle; as fast as the crops are taken out, it is dug over and replanted. In the drought it is carefully watered; as a precaution against excess of wet, it is most carefully drained. It is not unusual to see at night every plant in a quarter-acre plot covered with a bell-glass.

Let us now critically look at the results obtained from such careful culture. Around Paris there are 50,000 acres given up to the field culture of vegetables, and 25,000 to the forced culture

of the same. The annual rent of this land ranges from no less than £18 to £30 per acre, whilst the market-garden land as near to London as Kew only fetches as maximum figures £7 to £10 per acre. An example of the result of intensive culture may be taken from a garden measuring only 2·7 acres. This small patch afforded work for eight people in its cultivation, had had a capital outlay of £1,136 made upon it, paid annually £100 for manure and £100 for rent and taxes. But it produced no less than 250,000 pounds of vegetables and fruit; whilst so fast was the loam made in the forcing beds that 250 cubic yards were sold each year.

There are over 1,075,000 acres given up to such culture in France, and these are not the best lands that have been so taken, but generally what has been before regarded as waste. For instance, the sand stretches reclaimed from the sea on the Cherbourg coast send no less than 300,000 cwt. of vegetables to London alone. In Brittany strawberries are grown to compete with the Hants and Kent crops; whilst the marshes of the Dol, protected with a dyke, are now let out at rentals varying from £2 10s. to £4 per acre.

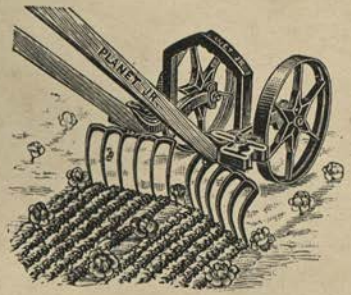
Belgium has gone into this business with a will. Vegetable seeds of the species finding the readiest sale are distributed gratuitously by the horticultural societies; experimental farms and stations have been established; whilst agricultural schools and evening technical lectures have been organized. The gardens of Flanders, the sand-deserts of the Ardennes, peat-bogs which have been drained, and the large irrigated plain of Haeren, are all utilized in this culture. There are altogether over 110,000 acres thus cultivated. The soil in each is made and is warmed;* glass frames, bell-glasses, planting out, watering and

* In connection with forcing by heat, it may be interesting to mention that the attention of scientists has recently been directed by accident to a curious phenomenon in regard to the refructifying effect of intense and open-air application of heat. On September 2 last a large fire broke out in the village of Châussée-sur-Marne, and destroyed a large part of the village.

draining, and all such expedients, are resorted to. The land often returns the high rate of rental of £24 to £27 per acre, and on such land onions are grown to fetch, as we have seen, an average of 5s. per cwt. Similar conditions of agriculture obtain in Holland, a country rapidly coming forward in regard to its vegetable culture.

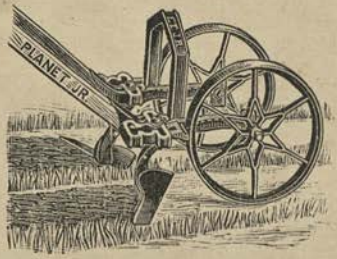
Looking across the Atlantic, we see again the same system of culture on the 'truck farms' of Virginia, and the gardens around Chicago. We thus see that 'intensive culture' is now to be found in widely separated parts of the world. It is also made patent to us that if Brittany and Belgium can grow our strawberries for us, whilst Paris supplies the London market with lettuce in June, there is abundance of hopeful outlook for the Garden City gardener. Moreover, that we do not fulfil our own requirements is due to our neglect of *intensive culture.*

The fire also attacked the neighbouring trees, forming part of a large pear and apple orchard, and reduced the first two rows entirely to ashes. The three following rows, protected by the first and the distance, remained standing, although considerably damaged and badly scorched. The injury done to the sixth row was naturally not so great. A goodly number of branches, nevertheless, were scorched and unable to resist the heat, while the remainder subsequently exhibited a peculiar phenomenon—namely, a second flowering. This began at the end of September, and in October all the branches of the trees except those that had been scorched were covered with blossoms, as in the month of May, the ones most heavily laden with flowers being those that had been most exposed to the action of the heat. In another direction the fire had ceased in the vicinity of some lilac bushes, and these, as well as some plum-trees, flowered anew, the lilacs in particular being covered with blossoms. All the species that blossomed are those whose buds for the following year are formed in the month of August. Now, the facts gathered by Mr. Jolly, an eye-witness, seem to show that it is possible for a momentary but strong action of heat to produce a second flowering.



Raking.

Late Hoeing.



First Hoeing.

Light Cultivators with Interchangeable Tools.

NOTE ON SPADE CULTURE IN SMALL HOLDINGS.

The greater output of land under cultivation by means of small holdings—a matter now engaging much attention—is obviously principally due to the greater amount of labour expended per unit of area. As bearing upon this, the result of the spade culture of five acres of land by Mr. Samuel Vallis is both interesting and valuable.

This cultivator from the small area of five acres shows a gross return of £109 10s. His live stock consisted of two cows and two pigs, his grain crops being an acre of wheat and half an acre of green peas. On the debit side he puts down £3 an acre for rent, £5 10s. for seeds, and £20 16s. for labour. Mr. Vallis, it should be pointed out, is by profession a schoolmaster; hence the latter item is, of course, one necessary in his case, but would not be incurred—as a money payment—by the labourer. Thus is shown a profit of £68 4s., which, it is almost superfluous to point out, approximates to nearly double the wages of the ordinary farm labourer. Mr. Vallis steadily pursued what he called 'the soiling system' with his cows—*i.e.*, they were constantly fed under cover—and he reckons that the advantage of this over the 'exposed system'* is fully 25 per cent. He adds, that if young agricultural labourers remained single till twenty-five, and saved half their wages, they would soon find themselves in possession of the necessary capital for such a little holding—or, indeed, for one three times the size—and, given the requisite industry and intelligence, could reap a corresponding profit.

NOTE ON DEEP CULTIVATION.

The system of deep cultivation is based on the well-known fact in agriculture that the greater the amount of surface of the soil exposed to the air, the greater the regain by that soil of the products lost in former cultivation, a fact pointing to the moral

* See reference to this system in 'A Glimpse of Fair Italia and Tyrolean Thals,' by the Author.

that, to produce good crops, the soil must be thoroughly aerated. The first exponent of the value of deep ploughing was Jethro Tull, who carried out his experiments on his farm of some 200 acres in Oxfordshire. So successful was he that he gained the commendation of such experienced agriculturists as Cobbett and Young, the promoter of the theory of alternate crops.

The Marquis of Tweeddale, on his Yester estates, followed the system of Tull with conspicuous success. He also drained his land, in addition to ploughing, to a depth of some 22 inches, and subsequently thoroughly breaking up the ground so ploughed. In this way he obtained as much as 40 bushels of wheat to the acre.

General Sir A. Cotton has in more recent years followed the same system both for wheat and grass cultivation. He is said to have ploughed to a depth of 36 inches, and to have obtained as much as 100 to 140 bushels to the acre for wheat, and 4½ tons of grass for a first cutting and 7 tons for his total (three) cuttings per acre in one season. He also grew maize 8 feet in height, and yielding 120 bushels to the acre.

Other crops have been grown with equally great success, but failure has also attended deep cultivation in the hands of beginners. In these cases the reason for inadequate results seems to be that the ground, although being turned over to a good depth, so that the subsoil has been thrown up, was not allowed sufficient time to get the full effect of aeration, nor was it sufficiently well broken up. When deep ploughing is resorted to, it should be done in the autumn, for crops to be sown during the following March or April, in order to get the full benefit.

APPENDIX II. TO CHAPTER VIII.

NOTE ON CANADIAN FARMING.

As the outcome of the proceedings of a Select Committee appointed to take evidence as to the best means of giving practical aid to the farmer, the Canadian Sessional Parliament in 1885 voted $20,000 for the establishment of an experimental farm. The first step taken was the despatch of Professor Saunders on a tour of inspection of the agricultural colleges and experimental farms of the United States. The result of his journeys was set out in a long report concerning each institution visited, and a summary of the evidence thus collected. The main contention was that agricultural colleges were expensive in comparison with the small number of students actually benefited. Hence it was considered that at the present time it is advisable to establish purely experimental farms.

The plan mapped out by Professor Saunders to this end in Canada was as follows: Firstly, a central station of 400 acres should be established in an average climate as regards the Dominion. At this the cultivation of cereals and field crops should be specially studied, but fruit should also receive special attention. Subsequently, but as soon as possible, should be established five substations: one in Nova Scotia, a second in New Brunswick, a third in Manitoba, a fourth in the North-West Territory, and a fifth in British Columbia. The third and fourth of these he suggested should contain 640 acres, land in these districts being extremely cheap, and the larger area would allow of experiments being made in stock-raising and forestry. The other three were to have an area of 200 acres only.

To control all these there should be one director, with his headquarters at the central station, who would visit each station in turn. He was to be responsible for all the work done, and to present a report annually to the Government on the results attained. He would have as his staff at the central station superintendents of the following branches: agriculture, horticulture, and forestry. There would also be attached an entomologist, a

botanist, a chemist, and a veterinary surgeon; whilst at the provincial stations there would be superintendents of agriculture and horticulture. In addition to these experimental farm stations, the establishment of experimental nurseries and propagating houses was also strongly advocated.

At each station a museum was to be established, to contain specimens of the station crops and the ordinary farm crops as raised from year to year; specimens of insects, classed into those injurious and those helpful to the agriculturist, and birds, the latter in the same way divided into those harmful and those beneficial to the farmer. Lastly, the officers of the stations should attend all public meetings of farmers and fruit-growers for conference and discussion, so that they might know in what directions the agriculturist most wanted help, with the further advantage that the inherent mistrust of the scientist by the cultivator would be eliminated under the genial fellowship engendered by constant intercourse. Moreover—and this is a most important point—all reports and printed matter issued by the Department should be sent *free* to all farmers, whilst all the products of the experimental stations were to be sold in open market. Most valuable of all, perhaps, seed appropriate to the various districts was to be distributed gratuitously.

Such, briefly, was the scheme advocated by Professor Saunders. In February, 1886, an Act was passed by which the Central Farm at Ottawa was started. Professor Saunders was made the director, and continues to hold that position to the present day. By 1889 substations had been established at Nappan in Nova Scotia, Brandon in Manitoba, Indian Head in the North-West Territory, and Agassiz in British Columbia.

To understand and appreciate the valuable work done by these experimental farms, we have to take the annual Blue-Book —a bulky volume, replete with interesting and essential information—containing the reports of the director and his assistants. The following figures are taken from the last Blue-Book issued—viz., that for 1902. The experimental crops at the different stations were as follows:

Varieties Grown of—	Central Farm, Ottawa.	Nappan.	Brandon.	Indian Head.	Agassiz.
Oats	97	65	64	65	64
Barley ...	73	51	51	52	51
Spring wheat	119	72	71	71	71
Peas	61	57	57	57	57
Indian corn ...	38	36	38	37	36
Turnips ...	30	31	30	29	29
Mangels ...	28	27	27	27	27
Carrots ...	20	20	21	20	20
Sugar beets ...	8	8	8	8	8
Potatoes ...	12	90	87	89	90

The results of these are carefully set out as to the name and variety of seed; number of days occupied in maturation; length of straw, its character; length of head, its character; yield per acre; weight per bushel, together with particulars of the rusts in the case of cereals. With the root crops only the yield per acre is given. Each variety of seed is sown for some seven successive years, so that its exact value is determined. Careful and laborious experiment and investigation have been directed towards ascertaining the seeds which best suit each district. This is a matter of both individual and national importance, for as Professor Saunders remarks in one of his reports, every bushel of oats added to the average crop per acre puts a million dollars into the pockets of the Canadian farmers. Of equal importance with the determination of the seed are the careful summaries of the results attained by the use of different manures.

As bearing upon the vital matter of dissemination of information to farmers, it may be mentioned that during the year 59,441 letters were received at the Central Farm alone; that 29,795 required and received written replies, the remainder being answered by the sending of printed reports or of seed. The printed matter despatched during the year consisted of 45,485 circular letters and circulars, and 220,426 reports and

bulletins. Lastly, the sub-stations received 13,876 letters, and wrote 12,126 replies, besides sending out a quantity of circulars.

One of the most valuable features of these experimental farms and helpful expedients has been the free distribution of seeds in 3-pound packages to those applying for them. The value of these packages, which are the most carefully selected seeds from the crops at the experimental farms, can be best shown by an extract from a letter, merely one of some thousands received annually. The writer says: 'I raised a crop of 1,100 bushels of "American Beauty" oats this year. I started four years ago with 3 pounds, which I got from the experimental farm. . . . All my neighbours and a great many from a distance are now getting their seed oats from me.'

The following table will give some idea of the magnitude of this branch of the work, and the esteem it is held in by the farmers:

TABLE SHOWING FREE-SEED DISTRIBUTION 1902.

Seed.	Central Station.	Nappan.	Indian Head.	Brandon.	Agassiz.	Totals of Each Seed.*
	Packets.	Packets.	Packets.	Packets.	Packets.	Packets.
Oats ...	14,567	208	380	401	147	15,302
Barley	2,726	67	264		113	3,170
Wheat	4,955	83	265		209	5,512
Peas ...	2,322	40	230	—	123	2,715
Indian corn	1,772	—	—	—	—	1,772
Potatoes	8,791	325	725	237	268	10,346
Buck-wheat	—	16	—	—	—	16
Winter rye ...	—	6	—	—	—	6
Flax, Rye, etc. ...	—	—	111	—	—	111
Totals	35,133	745	1,975	638	860	

* In calculating these the cereal seeds distributed at Brandon are left out, as they are unclassified.

The gratuitous distribution of seed aggregates to a grand total of 39,351 3-pound packages for the year. In 1899, so popular had the system become, that a new departure was instituted. Packets of seeds sufficient to sow a plot a tenth of an acre were sent to a special list of farmers selected from those who had evinced the greatest interest in this seed-growing, such special list extending over the whole Dominion. The seed sent out in this way in the larger packets is sown under special conditions. It has to be put into selected plots and notes taken, and a record made of their growth, the results of the crops obtained, and a report sent to the director, so that he might compare the results obtained over the whole country with those at the experimental farms. These have proved as valuable and as great a success as the smaller packages.

The Canadian farmer has long since learned the value of investigation, and the application of science to the land, and is now only too willing to help forward the work. The following table gives particulars of this work for the year 1902:

DISTRIBUTION OF SAMPLES FOR ONE-TENTH ACRE.

Name of Grain.	Prince Edward Island.	Nova Scotia.	New Brunswick.	Quebec.	Ontario.	Manitoba.	North-West Territory.	British Columbia.	Total.
	Pkts.	Pkts.	Pkts.	Pkts.	Pkts.	Pkts.	Pkts.	P .	Pkts.
Oats ...	40	104	130	237	591	125	99	14	1,340
Wheat	36	30	84	280	31	58	63	14	596
Barley	11	42	20	87	116	38	22	3	339
Total	87	176	234	604	738	221	184	31	2,275

Adding these 2,275 packets to the 39,351 already mentioned, we find that a total of 41,626 packages of seeds was given

gratuitously to the Canadian farmers in the one season only. The reader should contrast this with the effect of farmers sowing in haphazard fashion, or even striving to ascertain by individual test how to obtain the most suitable seed; and, further, consider the effect upon the farmer's income.

The report of the official agriculturist ranges over the whole gamut of subjects: Horse-feeding; cattle-feeding, both for dairy and butchering purposes; shallow cultivation; rotation of crops, closing with carefully compiled tables of cost of the various crops grown on the Ottawa farm. From this I may quote a few of the results. Thus, fifty-five acres of oats produced 3,052 bushels 23 pounds, or an average of 55 bushels 17 pounds per acre, and cost $619.07 to cultivate, including the threshing, equivalent to 22⅓ cents (11⅙d.) per bushel. Sixty-three acres of hay yielded 2 tons 1,347 pounds per acre, and cost $3.72 per ton to cultivate. Twenty-nine and three-quarter acres of corn grown for ensilage yielded 446 tons of corn, at a cost of $1.76 per ton. Six acres of mangles cost $32.15 per acre, and produced an average yield of 26 tons 156 pounds per acre, which works out at $1.23¼ per ton for mangles housed for winter use. Turnips cost $1.51 per ton, and pumpkins $2.06. Having in Chapter VI. given a table of the cost of growing sugar-beet in Germany, I may here add the full table of cost at Ottawa:

COST OF GROWING 1 ACRE OF SUGAR-BEETS.

	£	s.	d.
Rent of land, at $3 per acre	0	12	6
Gang ploughing in autumn, 4 hours at 25 cents	0	4	2
One-fifth manure, at 15 tons per acre, $1 per ton	0	12	6
Ploughing in spring, at $2 per acre ...	0	8	4
Harrowing in spring	0	1	8
Drilling in spring	0	3	1½
Carried forward ...	2	2	3½

	£	s.	d.
Brought forward ...	2	2	3½
Rolling in spring	0	0	8
Seed, 12 pounds at 20 cents	0	10	0
Sowing, 5 hours, at $1.33⅓ per day ...	0	2	9
Hand-wheel hoeing, 6 hours, at $1.33⅓ per day	0	3	4
Thinning, 5 days, at $1.33⅓ per day ...	1	7	9½
Hoeing twice, 28 hours	0	15	6½
Cultivating, single horse four times, at $1.75 per day, 4 hours each time = 16 hours	0	11	8
Ploughing out roots, 4 hours, at 25 cents ...	0	4	2
Pulling and topping, 4 days, at $1.33⅓ per day	1	2	2½
Drawing in roots, 14 hours, at $2.50 per day	0	14	7
Loading and unloading, 4 days, at $1.33⅓ per day	1	2	2½
Total	8	17	2½

Average yield per acre, 19 tons 367 pounds; cost to produce per ton, 9s. 3d. approximately.

The official horticulturist presents a lengthy report on fruit and vegetable crops, trees and flowers. In this relation it should be mentioned that in the twelve years from 1889 to 1900 this Department has distributed, free of cost, no less than 15,000,000 young trees, besides tree-seed, to farmers in the plains, so that they may put plantations round the sides of their cornfields, to protect the grain from the wind-storms that sweep across the vast open prairies at certain times of the year.

The official chemist reports upon soil analysis, fodders and feeding-stuffs, insecticides, fungicides, sugar-beets, flour, tuberculin, and the examination into alleged cases of poisoning.

The following table shows the extent to which farmers sought the services of this expert during the year:

SAMPLES RECEIVED FOR EXAMINATION AND REPORT, NOVEMBER 30, 1901, TO DECEMBER 1, 1902.

Samples.	British Columbia.	North-West Territory.	Manitoba.	Ontario.	Quebec.	New Brunswick.	Nova Scotia.	Prince Edward Island.	Total.	Number still awaiting Examination.
Soils	12	3	5	100	6	3	25	4	158	21
Mucks muds, and marls	2	1	—	4	4	6	9	10	36	8
Manures and fertilizers	—	—	—	4	—	1	7	4	16	6
Forage plants and fodders	2	15	13	74	5	12	9	9	139	19
Well waters	1	12	10	53	19	3	3	1	102	—
Miscellaneous, including dairy products, fungicides, and insecticides	3	4	4	115	4	7	8	2	147	4
Total	20	35	32	350	38	32	61	30	598	58

There are also reports, all of the same practical and useful character, from the botanist, the entomologist, and also the poultry-keeper; together with full reports from the heads of the branch farms.

The foregoing, I trust, will give an idea of the fine organization and valuable work of the Agricultural Department of our Dominion of Canada. The question will doubtless arise in the mind of the reader, 'What is its cost?' This question may best be answered by the following figures:

SUMMARY OF EXPENDITURE, 1901–1902.

	$
Central Experimental Farm	48,607.87
Nappan	14,536.43
Brandon	12,324.49
Indian Head	10,508.76
Agassiz	10,799.03
Distribution of seed, etc.	5,223.42
Total	102,000.00

A sum equivalent to £21,250 sterling; whilst the value of the live stock, machinery, implements, and furniture on hand is summarized as follows:

	$
Central Experimental Farm	26,497.17
Nappan	6,877.10
Brandon	6,039.80
Indian Head	7,595.00
Agassiz	3,737.35
Total	50,746.42

or in English money £10,576 6s. 9d.

In conclusion, let us note what Dr. Saunders, the director, has to say as to our own country. In 1900 he visited England, and in his report to his Government he remarks: 'I find that in 1898-1899 the English Government granted £834,908 to be spent on technical education. These grants are distributed for disbursement to the County Councils. These bodies in the same year spent £80,000—*i.e.*, about one-tenth of the total grant—on agriculture, mostly in experiments. The results of these experiments are published in booklets, which cost sixpence or a shilling per copy to obtain. If they were distributed freely, as in Canada, by a central authority, they would doubtless do much good, but at present it is doubtful if they ever reach the persons they are intended for.'

In reviewing the fine agricultural work done by Britain's sons beyond the seas one is perforce led to reflect how it came about that the ancient industry should have become so neglected at home. The reason is sufficiently obvious. The invention of the steam-engine, and its introduction as motive power for mills and factories, set up a wave of manufacturing progress quite unprecedented in the world's industry. Consequent upon this a great exodus from the country to the textile towns set in, and in turn, in fulfilment of the requirements of textile industries, great engineering centres became formed. Hence agriculture became neglected with us, whilst the opportunity afforded by our demand for agricultural produce was seized upon by our competitors to

establish their farming both firmly and scientifically. But they also invoked science in their manufactures, and are now rivalling us in urban industries; whilst we are still compelled to buy our food abroad, simply because we cannot produce, as I have shown in the preceding pages, anything like sufficient for our wants. To rectify matters it is obvious we must follow in the footsteps of others, and reorganize our methods. Technical education may do much, but, as Dr. Saunders' indictment serves to show, it is both very costly and very partially efficient.

My object in bringing to the notice of my readers details of Canadian methods, in conjunction with my plea for the application of science to the land, is to emphasize my view that what we want is the establishment of similar experimental stations in the agricultural districts of Great Britain; so that by example, by demonstration, and by the dissemination of information by the central authority, British farmers may learn to greatly increase the output of the land, and thereby to grapple successfully with the competition which to-day overwhelms them.

I am, of course, not unmindful of the work that has been done by the existing colleges, especially the Royal Agricultural College at Cirencester, work that has borne, and will continue to bear, good and fruitful return. But these are insufficient in number, and too costly to meet the educational wants of those who are to be tenant farmers, tillers of the soil. Nor do I overlook the valuable experimental work carried out by the late Sir Bennett Lawes and his assistant, Sir H. Gilbert. These gentlemen, as also several other landowners, have merited well the honour they have gained, for they did their utmost to help forward the cause of agriculture. But private patriotic work of this nature, *ex necessitate rei*, cannot be carried out upon a scale of magnitude commensurate with the national necessities and requirements. Moreover, expenditure incurred at any one point and experimental work done at any one place must, it is obvious, lack the national value and importance of work carried on in a collative manner such as that which gives its distinctive character to the Canadian work here referred to; such as that, moreover, which

would characterize the joint co-operative work of the stations—widely set apart—which alone could be accomplished and controlled through the intervention of the State. The awakening has indubitably set in, as evidenced by the comparatively recent establishment of a Ministry of Agriculture. There is, therefore, reason to hope that in due course—and this, it is to be fervently hoped, speedily—the Minister of Agriculture of the British Isles may have at his command for national benefit a comprehensive organization similar in its nature and operation to that which has been established and has wrought such good work as the one so thoughtfully and so presciently established in our dominion of Canada.

A feature which must not for an instant be overlooked is that private experimentization cannot be carried out on commercial lines. Moreover, what we require, I repeat, are *experimental farms established upon a commercial basis*, and on similar lines to those of the Ottawa farm. Then, and probably not until then, could it be abundantly shown that there is a good living to be earned by tilling the soil, and by such mode of procedure we may justly expect to bring back once more to the land those who have left it, having in many cases been driven from it by reason of its inability to effectively minister to their support.

If an object lesson be required, perhaps nothing better could be cited than the work of the Royal Agricultural Society in the improvement of the breed of horses. Had the animate objects used in experimental evolution been drawn alone from a single district, little would have been accomplished in the direction desired; but being drawn from suitable breeds selected from districts spreading from end to end of the country, the results have been more than equal to the most sanguine expectations. The work of science and selection stands to-day revealed in the apposite proportionment to requirements and symmetry alike of shire-stallion and racehorse. It also stands revealed in the magnificent and quite surprising floral productions of the scientific horticulturist. But it does not, unhappily, proclaim

itself in the abundance of reproductive efficacy of our field-farmed acres.

If the effect of appropriate pairing has been so great in regard to animate reproduction, how much more important is the scientific selection of plants and seeds to render them best suited to withstand the detrimental influences of their environment! Even more potent in reproductive effect is the scientific selection of manures and the experimental testing of these in order to ascertain their effect in different districts, and thereby to obtain the maximum good from the minimum of weight, and, it follows, of expense applied per acre to land differently situated and conditioned, both topographically and climatically.

All this implies and requires a just appreciation of the enormous value and potentiality of science applied to land cultivation. Almost the first thing, therefore, to be done is to inculcate into the minds of our agriculturalists this appreciation, which nothing has been more practically efficient in bringing into being than the experimental farm at Ottawa, in conjunction with the work it has carried out through its branches, situated in widely different regions. It is this that we are lacking, and the desideratum is one which can never be consummated except by means of State direction and expermentization.

Garden Villages, even though they exist to so small an extent, have shown, as I have ventured to point out in the foregoing pages, that an innate love for the land and its culture exists within the Briton. It is, then, necessary to show these lovers of the land that they can live by it, and I venture to suggest that, by the utilization of Garden Cities, in fulfilment of work similar to that of the Canadian branch establishments, the means of bringing about the nationally necessary changes are at hand.

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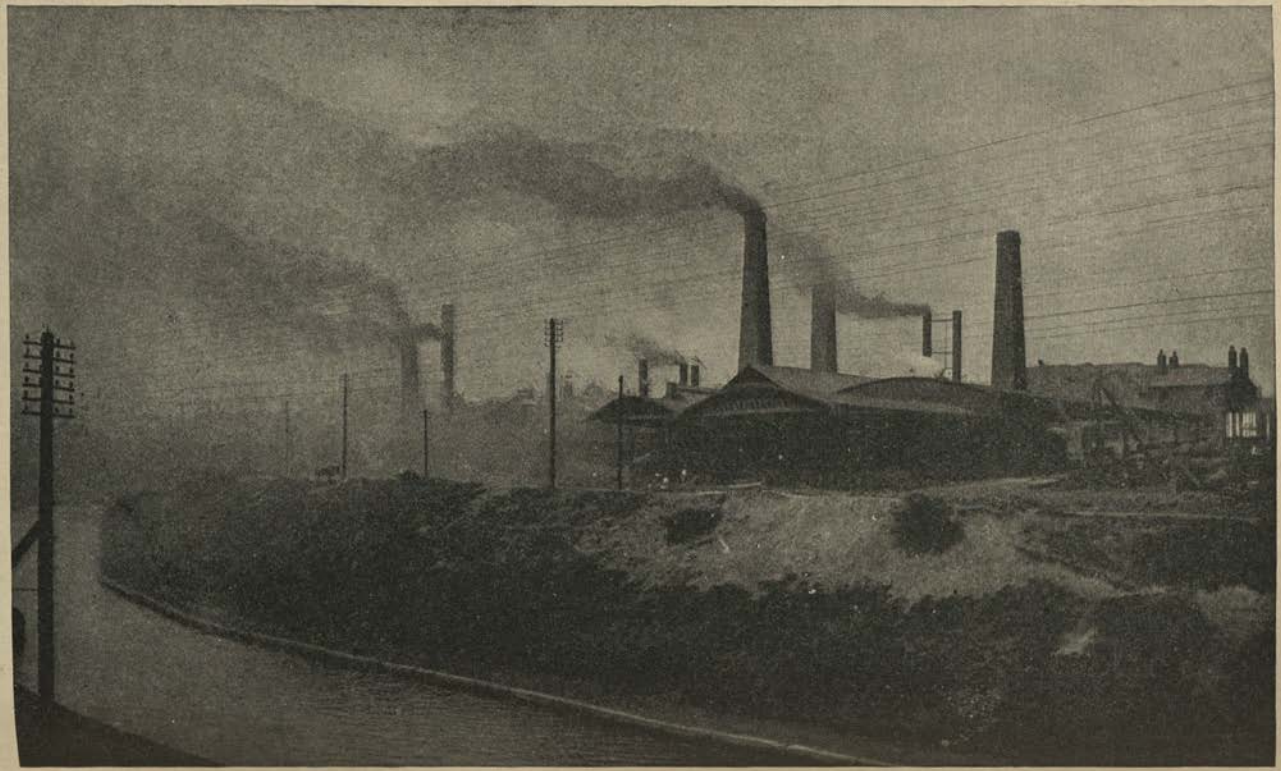


The Old Style. Effect of Burning Solid Fuel. Typical View in Staffordshire. A Defiled Atmosphere.

CHAPTER IX

THE POTENTIALITIES OF APPLIED SCIENCE IN A GARDEN CITY*

'Le travail et la Science sont désormais les maîtres du monde.'—D. SALVANDY.

THE great social problems—of transcendental importance—the prevention of further overgrowth and overcrowding of our large cities, the provision of better and more healthy homes for their vast working populations, and means of efficient urbo-suburban and economical personal transport, have been dealt with in F and other sections of the British Association, but always—and necessarily—in a fragmentary and speculative manner.

The epoch at which we have now arrived in these islands in regard to the existence and development of large towns, coupled with the fact of the immense disproportion in the relative number of operatives required in agricultural pursuits upon the one hand, and in urban industrial, clerical, and commercial occupations upon the other, has led to the almost entire abandonment of hope that any scheme

* Excerpt from a paper read before the British Association (1903 meeting).

efficiently compassing the *desiderata* I have referred to, and at the same time successfully providing means for the much-needed 'return to the land,' can ever now be consummated.

It has, of course, been felt and foreseen that in cases of extreme acuteness such 'return to the land' could be effected on a small scale upon philanthropic and charitable lines by the establishment of small so-called industrial colonies. Such schemes, however, are, by their nature, so far removed from movements of universal applicability and national importance that obviously they cannot command serious and careful consideration beyond that of expedients for the temporary alleviation of poverty.

It is therefore with a feeling of the greatest satisfaction and pleasure I am enabled to make the announcement, not only that such a scheme has at length been evolved by persevering thought and effort, but also that, in a practical and workable form, it is at once to be put to experimental test, and this upon a scale amply sufficient to demonstrate its successful working in a community of no mean size — a community, indeed, of such importance that success in its regard would at once constitute a practical demonstration — a veritable working model — of the solution of the hitherto unsolved problem, and, by actual proof, expose its enormous prepollence and potentiality, whilst ushering in a movement of vast industrial reform and of the highest national importance.

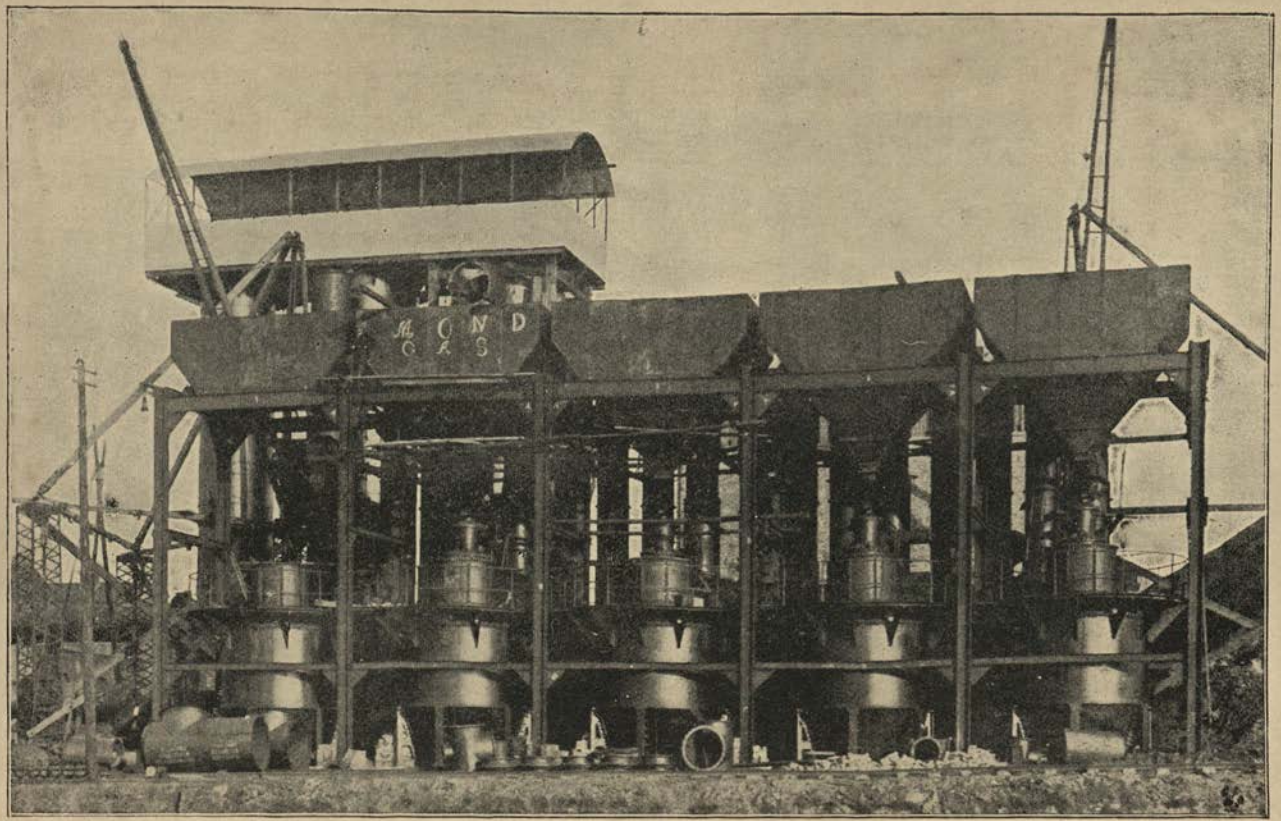
Social advance does not differ from science progress, or mechanical development, in that the discovery of modes of improvement and the carrying of them into useful effect is seldom traceable to the research and initiative of any one individual. Indeed, it would seem almost a natural law that material and collective progress should be the outcome of transmitted, abstract, isolated, and individual progress. Hence we find, in regard to the subject now engaging our attention, that theories for such social advancement have formed matter for lucubration of many minds. Schemes, varied and numerous, dealing in speculative and abstract fashion with the various aspects of the problem have been put forward by many; but the credit of having by long research and patient thought evolved a concrete whole, and by unswerving zeal and indomitable persevering efforts brought others to appreciate the practicability of his proposals and the solidarity of the foundations now about to be laid, is undoubtedly due to Mr. Ebenezer Howard. The subject of the decentralizing of industry and the establishment of smaller industrial communities over the face of the country is one not only of philanthropic but national importance, and hence development is being watched with keen interest by the public.

My object is to touch upon the potentialities of applied science in connection with the establishment of a new town and new community, such as that foreshadowed and described by Mr. Howard in his

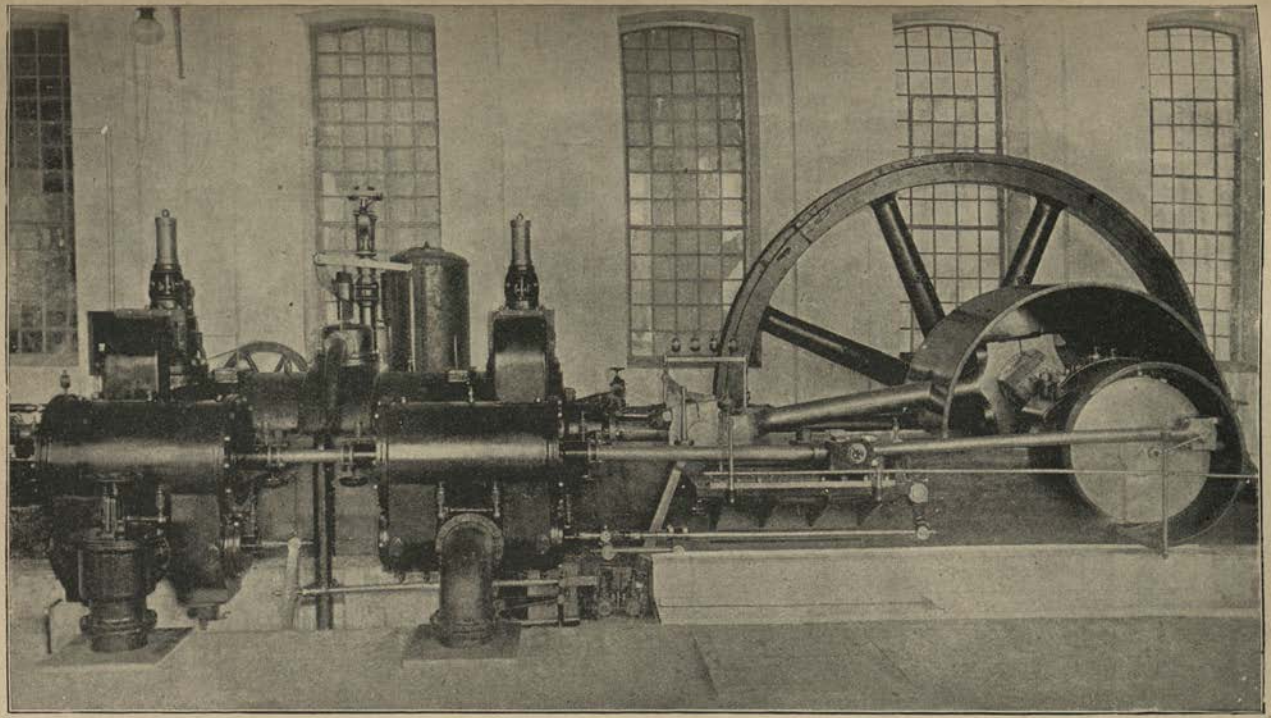
book 'Garden Cities of To-morrow.' Obviously, whatever these may be, and no matter how much to be desired, they, in their passive state—apart from scientific interest—are quite valueless unless they can be rendered industrially active, and this by assimilation and embodiment in the development of a city the financial foundations of which shall be both sound and lasting. This feature, of primary and paramount importance, it might therefore perhaps be better for me to touch upon before considering the more scientific aspect.

The assumption has been made that, given the freehold acquisition of a site of sufficient extent and at moderate cost per unit of area by a body of pioneers, who shall act, more or less, as trustees in the interests of the future community, the financial success of the undertaking can be assured —no matter to what magnitude it may subsequently be carried—by the reservation, for the benefit of such community, of the increment in terrestrial value of such site due to the emplacement thereon of a city laid out upon such lines that overcrowding shall be an impossibility, and which, in fact, shall provide for the allotment *per capita* of such an extent of ground area as to entitle the creation to the cognomen of 'A Garden City.'

By its very nature the ultimate growth and, *par suite*, the maximum number of its inhabitants must be limited; from this it is obvious that, apart from individual munificence, the ultimate municipal



The Modern Style. Ten Thousand Horse-power Cheap Fuel-Gas Plant constructed by the Power Gas Co., Ltd. A Clear Atmosphere.



A Power-Gas Engine in a Modern Station giving 500 Horse-power.

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success of the community is also dependent upon, and limited by, the increment of terrestrial value already referred to, and the value of land in the restricted City. Obviously, also, it is dependent upon, and limited by, the difference between the cost price of the land of its estate and the ultimate value of it. Moreover, the speed of growth will be directly determined by the speed of such increment. Herein is presented both an unusual condition and a difficulty, for in the ordinary way municipal enterprise is untrammelled, except by considerations of the levying of excessive rates and the overstepping of borrowing power. In Garden Cities, therefore, it would seem that the granting of ordinary long leases from itself to its inhabitants would not meet the requirements of rapid growth, for it must be remembered the proposals are that the entire revenue is to be derived from 'rate-rents,' and these it is estimated will be sufficient to fulfil the following requirements:

(*a*) To pay the interest on the money with which the estate is purchased.

(*b*) To provide a sinking fund for the purpose of paying off the principal.

(*c*) To construct and maintain all such works as are usually constructed and maintained by municipal and other local authorities out of rates compulsorily levied.

These 'rate-rents' would comprise rent as usually understood *plus* the various rates as levied by the

Local Authorities. Such a system of tenure would possess undoubtedly certain advantages, for an inhabitant of a Garden City would always know exactly the amount he would be called upon to pay annually, and this for the whole term of his holding; but, on the other hand, the trustees would be disadvantageously placed, for the reason that they would be unable to levy upon their tenants further contributions, as and when required, for municipal extension, it being necessary in all cases to wait until the expiry of the terms of holding.

Obviously, therefore, the periods for which leases could be granted would necessarily be short ones. This, perhaps, would not offer any great difficulty in regard to agricultural land, which being in the immediate vicinity—indeed, virtually part of—a growing City would rapidly increase in value. For the proposed tenure would be a far more equitable one than that usually obtaining from the fact that it is proposed the increment in value should be assessed by experts, and the land let by tender, the *pro tem.* occupier having the option of retaining his holding at 10 per cent. below that of the highest tender, the tenderer, or 'hypothetical' tenant, being called upon to fairly compensate the outgoing tenant for all his unexhausted improvements. It is difficult to see, however, that such a system could be practically carried out in regard to industrial undertakings, since capitalists would not invest large sums in buildings, such as factories, upon land so held.

Were the trustees prepared to themselves erect the factories, the conditions would be altered; but even in that case one sees difficulties in regard to extension of such municipally-owned factories, as also in regard to the unsuitability of such erections for other purposes at the expiration of the leases. It would therefore seem necessary to grant land leases for industrial purposes upon lines more or less approximating to those at present obtaining. It should, however, be pointed out that, even in this event, the increment would still proceed, for the rate-rental accruing to the City would increase proportionally with the increase of the number of the staff and operatives.

Mr. Howard has estimated that, given an estate of 6,000 acres, of which 5,000 acres shall be agricultural land and 1,000 acres city land, his revenue would be as follows:

	£
Rate-rent from agricultural estate - -	9,750
„ „ home building lots - -	33,000
„ „ business premises employing 10,625 persons at an average of £2 per head - - -	21,250
Total - - - - -	64,000

and his expenditure as follows:

	£
For interest on purchase-money, £240,000 at 4 per cent. - - - - - -	9,600
For sinking fund, thirty years - - -	4,400
For such purposes as are elsewhere defrayed out of rates - - - - -	50,000
Total - - -	64,000

The basis here taken is that a Garden City estate of 6,000 acres shall lodge 32,000 inhabitants, and that an equitable average of rate-rent *per capita* would be £2 per annum; thus, 32,000 people would contribute £64,000. The average rate per head for England and Wales is estimated at about £2 per annum and the rent at about £2 10s. per annum, so that the average 'rate-rent' per inhabitant for England and Wales is £4 10s. per annum as against £2. If, then, the income of £64,000 is sufficient for the municipal needs of a Garden City, the fortunate dwellers therein would pay a far smaller average 'rate-rent'—indeed, would live rate free—as well as enjoy all the special advantages accruing from the idiosyncrasies of the new type of city.

As regards the agricultural tenant, he would pay as 'rate-rent' an average of £1 19s. per acre, which would represent an increase of but 50 per cent. upon the average value (£1 6s. per acre) paid as rent alone for good farming land.

Leaving the argument as to increment of revenue as related to a rate-rent charge per head of population, and considering it merely from the standpoint of terrestrial increment as evidenced in our large towns, it will also be seen that the financial prospects—in the case of a tract of adequate size being secured—are most encouraging. A feature which must not be lost sight of is the fact that all land acquired for municipal purposes, no matter how large and commercially prosperous the city may grow,

will have cost it merely its agricultural value, and all that has to be debited against such land are the percentages for interest of money expended and for amortization of its small capital sum; whereas in existing towns the cost entailed in securing sites for municipal buildings, public libraries, museums, picture-galleries, schools, playgrounds, and the like, is often enormous.

Even from the time of inception land values will rise, from the fact that agricultural land—the surroundings of large centres of population—becomes rapidly transformed from agricultural land into market-garden land. We may take the case of London. Even but a short distance from the Metropolis farm land returns little more in rent than it does at great distances. We find that upon a zone, say twenty to twenty-five miles out, the average rate of agricultural rental obtains—viz., from 18s. to 30s. per acre; on a zone of from twelve to twenty miles out it averages about £2 per acre; at eight to twelve miles distant we find grazing land letting at £3; whilst at from five to eight miles we are within the market-gardening zone, and there we find the price to be £5, £7, to £10 and even £12 and upwards per acre. Yet even the latter figure, it is interesting to observe, is less than one quarter that of market-garden land close to Continental cities.

Any estimate, based upon pure conjecture, of the rate of increment in land values would be of no practical use, although there is abundant evidence

already that the land will be rapidly taken up as well for private residences as for manufactures. One must, therefore, be contented with carefully thought-out estimates of the result when all the land shall have been taken up. Mr. Howard has done this most carefully upon a *per capita* basis, and I will therefore review it from the acreage point of view.

Assuming an estate of 6,000 acres, this would probably be divided up, approximately, in the manner shown in the table :

APPORTIONMENT OF THE LAND.
(Approximate in acres.)

USE.	PRODUCTIVE.	UNPRODUCTIVE.
	Privately Enclosed.	Publicly Utilized.
1. City proper	1,000	—
2. Roads, streets, squares, and public promenades	—	250
3. Village	660	—
4. Roads and pathways between allotments	—	40
5. Park	—	100
6. Schools and drill-grounds ...	—	15*
7. Factory sites	50	—
8. Compulsory open spaces round factories	25	—
9. Municipal supply stations ...	—	20
10. Sewage farm	—	350†
11. Market-gardens	3,325	—
12. Market-gardens, roads and pathways for	—	165
	5,060	940

* It is assumed the schools will border upon the park, and the latter be available for playing.

† This is placed in the debit column, but may eventually bring an income.

In compiling the above table I have taken the following: (*a*) Factory space at the rate of 200 operatives per acre only—this reduced again by compulsory marginal space: (*b*) the maximum number of operatives to be about 10,000; (*c*) village area to provide for about 20,000 and; (*d*) five inmates per cottage; (*e*) six cottages to the acre; (*f*) a population of 10,000 in the City; and (*g*) 2,000 upon the market-garden lands. The density of population would then be in the village 30, in the City 10, on the land 1·66. In speaking of the density of population of a city the expression "average density" may be very misleading, a circumstance which occurs in regard to the Metropolis. For, taking the area as a whole—and this is more especially the case if we confine ourselves to the western area—we find that London is not a densely-populated town if we consider only its average density of population. Nevertheless, in specific areas the density is very great, and far exceeding the factor placed by sanitarians as a safe one. It is clear, therefore, to be hygienically correct, the average density should represent an average *uniform* density. It is equally clear, moreover, that this is not to be attained by packing houses closely in one area and averaging them by means of open spaces in others.

The income to the City will be derivable from items Nos. 1, 3, 7, and 11; of these, I will refer only to those returning profit in the form of rent. As to the village the following is a fair probable balance-sheet.

A.—VILLAGE ACCOUNT.

INCOME.	£	EXPENDITURE.	Capital Account. £	£
3,960 cottages at 12s. 6d. per week ...	128,700	Cost of building 3,960 cottages upon the 660 acres at £200 ...	792,000	
		Interest at 4½ per cent. ...		35,640
		Sinking fund (30 years) ...		13,490
		Upkeep and repairs at 5 per cent.		39,600
				88,730
		Balance carried to maintenance of Garden City		39,970
	£128,700			£128,700

B.—GARDEN CITY ACCOUNT.

Income.	£
City, 1,000 acres at £40	40,000
Factories, 50 acres at £40	2,000
„ 25 acres frontages at £20 ...	500
Village, as per account	39,970
Market-gardens, etc., 3,325 acres at £4 ...	13,300
	£95,770

Expenditure.	£ Capital.	£ Annual.
Capital sum for roads, Town Hall, and other non-remunerative undertakings, say	250,000	
Interest at 4½ per cent. ...		11,250
Sinking fund (30 years) ...		4,260
Cost of land, 6,000 acres at £40	240,000	
Interest on ⅓ at 5 per cent. ...		4,000
Sinking fund (30 years) ...		1,240
Interest on ⅔ at 4 per cent. ...		6,400
Sinking fund (30 years) ...		2,935
		30,085
Balance to apply to other purposes		65,685
		£95,770

I will not here pursue the calculations involved, which have elsewhere received most careful thought and consideration, but will merely point out that if one assumes a fair increment in value as between land purchased at agricultural value and the same when constituting an urban district and the proportionate revenue derivable from it, and the property erected upon it, it is easy to see that if to this be added the income derivable from all such undertakings, and coalition of undertakings as may fairly be taken as coming within the scope of municipal enterprise, without in the least degree encroaching upon the domain of private individuals, a revenue amply sufficient for the requirements of the most municipally successful City would be available.

Moreover, if we pause to consider the subsequent value of reservation of an ample amount of land—acquired cheaply at the outset—requisite for all municipal purposes subsequently, such as all public services, including inter-mural locomotion, public buildings, such as libraries, infirmaries, hospitals, and schools, we shall by contrast with the enormous expenditure of existing towns for the acquisition of such sites, for compensation for demolition and such like necessitated by overgrowth, at once appreciate the enormous value of the scheme before us—the building up upon a pre-determined plan—of a modern City.

Primâ facie it might be thought that, as such Cities are destined for all time to be sparsely popu-

lated, this would operate adversely from a financial standpoint. As an effective set-off against that, however, might be mentioned the enormous expenditure to be faced from time to time in overgrown cities in regard to rehousing. Referring again to the Metropolis, rehousing has cost the enormous sum working out at £260 per head of the displaced, or £1,300 per average working-class family—a sum far exceeding that *per capita* allowed in our most sumptuously equipped of hotels; a sum, moreover, sufficient to purchase a freehold suburban villa apposite to the requirements of a well-to-do family. Bearing intimately upon such considerations is the fact that the increment in value of any specific area being under the immediate control of the trustees, that great difficulty, now so keenly felt in many of our great towns, of the workers being driven farther and farther afield from their places of occupation need not arise in a properly laid-out City. In this connection, the following table of the comparative average values of rooms in areas designated as Central, Inner, and Extra London may be interesting:

Number of Rooms.	District.*								
	Central.			Inner.			Extra.		
	£	s.	d.	£	s.	d.	£	s.	d.
Two - -	0	8	2½	0	7	0½		—	
Three - -	0	11	11½	0	9	1½	0	7	2½
Four - -		—		0	10	2¼	0	8	5½
Five - -		—		0	11	10½	0	9	6½

* The areas are taken to comprise as follows:

Central Area.—The City, Westminster, Holborn, Marylebone, Southwark, Lambeth, and Stepney.

Or expressed in £ per annum :

Number of Rooms.	District. Central.			Inner.			Extra.		
	£	*s.*	*d.*	£	*s.*	*d.*	£	*s.*	*d.*
Two - -	21	6	10	18	6	2		—	
Three - -	31	1	10	23	14	6	18	14	10
Four - -		—		26	9	9	21	19	10
Five - -		—		30	17	6	24	16	2

Having now, I trust, touched sufficiently upon the financial aspect to show that the experimental City about to be commenced will be reared upon a foundation of commercial solidarity, I will pass on to the consideration of the potentialities of applied science in regard to this new and bold departure.

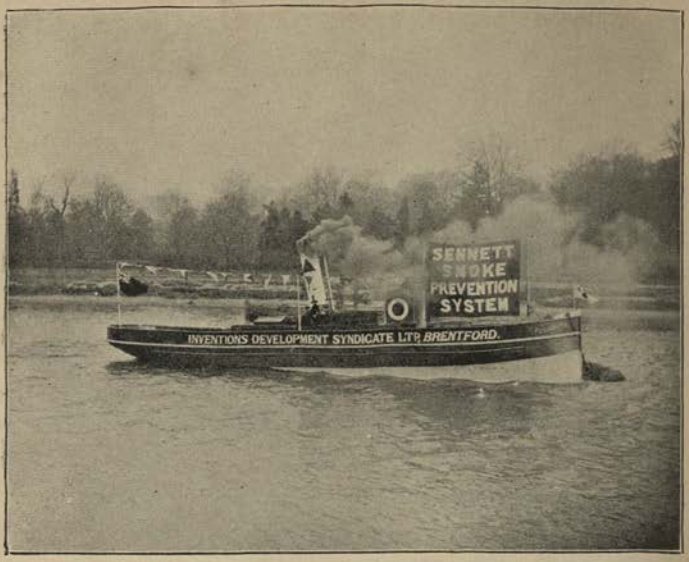
Next in importance to the provision of fresh air I think light and heat should rank.

Lighting, Heating, and the Smoke Problem.

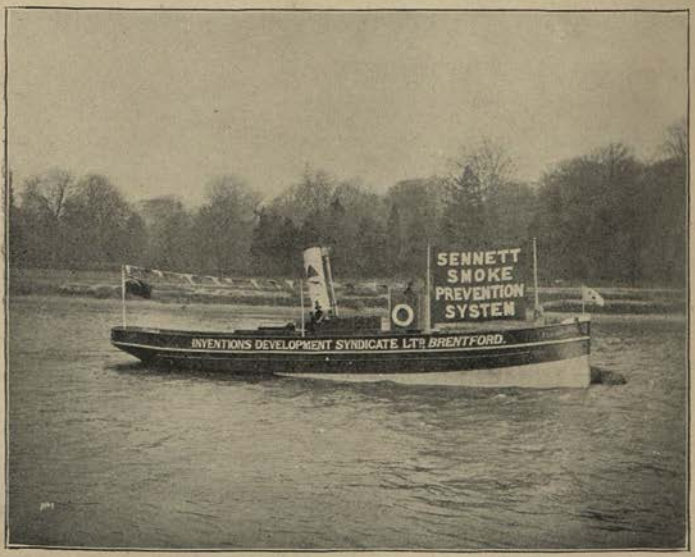
Among the many and grave disadvantages to which dwellers in overgrown and overcrowded towns are subjected, there is one fraught with the gravest detriment to the health and happiness of the inhabitants—one which so far may be said to have completely baffled all efforts of applied science. I refer to what has not been inaptly styled the 'smoke fiend.'

Inner Area. — That comprised between the above and the suburbs.

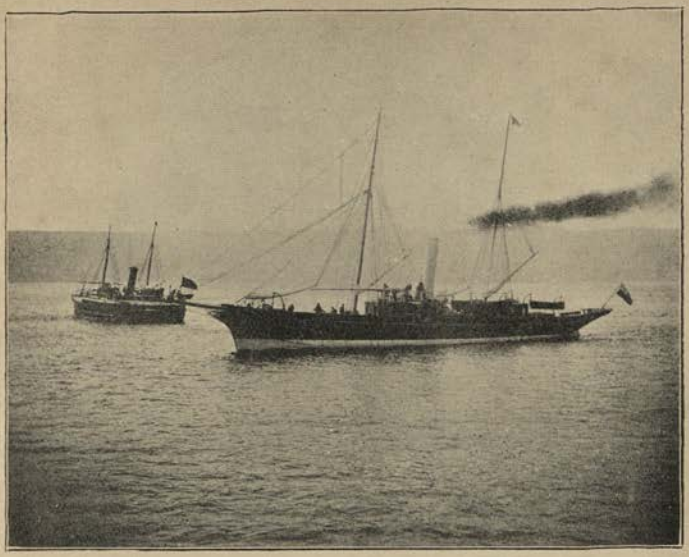
Extra London. — Brentford, Acton, Willesden, Edmonton, Finchley, Tottenham, East and West Ham, Leyton, Beckenham, Croydon, Penge, Barnes, Wimbledon, Merton, and Mitcham.



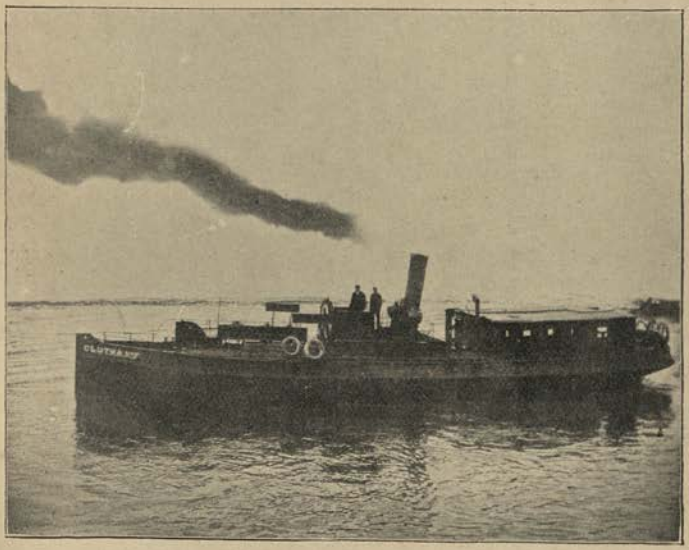
Experiments on the Thames, Firing-up heavily to produce Smoke.



The Smoke cut off immediately on putting the Apparatus in Operation.



The Sennett System of Smoke Prevention, Signalling with Dot-and-dash of Smoke on the Measured Mile.



Appearance of the Funnel of a Clyde 'Clutha' 3 Seconds after turning on the Sennett Apparatus.

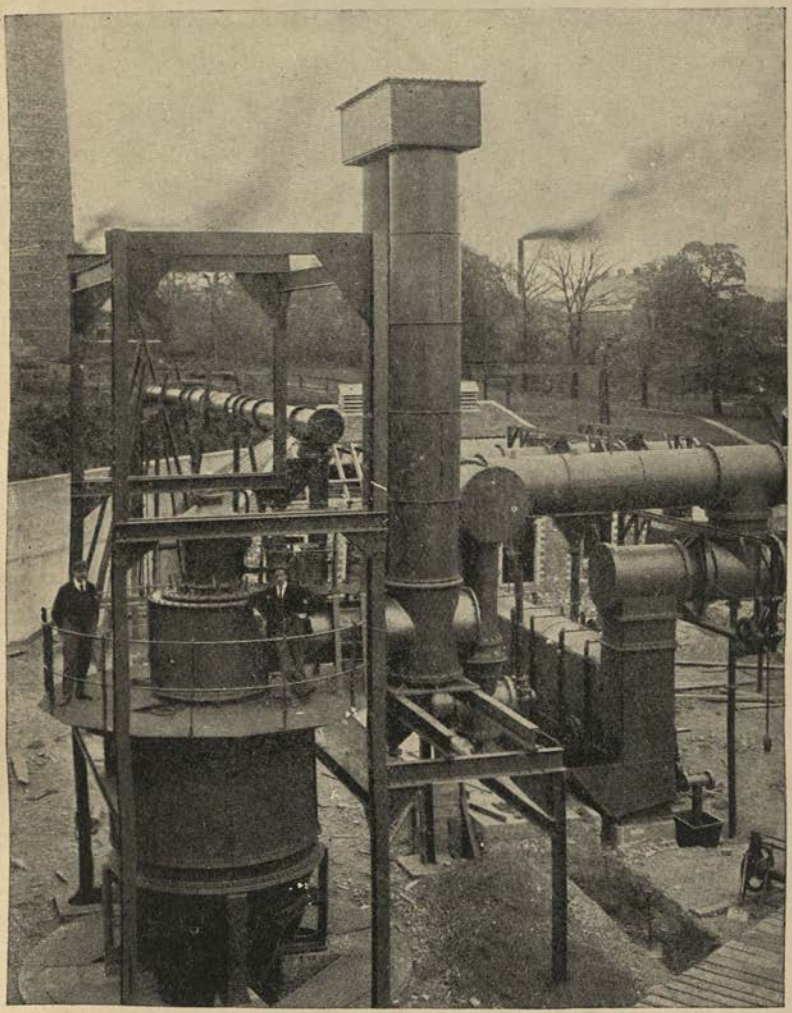
I will endeavour to show how, in a city built upon a singly-held tract of *terra natura*, and embodying in its conception and development not only all the beneficial attributes of modern applied science, but also—and this is of the essence of what I desire to bring forward—judicious and carefully premeditated coalescence of various branches of applied science, we may look forward, not only to the entire exorcism of this plague of modern urban development, but that in compassing this so desirable end it shall be accompanied with material economical gain—instead of loss—to the favoured inhabitants of the City.

Some years ago—at the Edinburgh meeting of this Association—I had the honour of addressing Section G. upon this important problem, and there I ventured to desecrate the stolid and silent quadrangle—sacred to learning—of the venerable University by the presence of a huge marine steam-boiler, in order that members might see for themselves that some four years of undivided research and labour upon my part had resulted in a solution of the problem in regard to industrial furnaces and steam-boilers, and that it was practicable to burn the softest and most smoky class of coal in such furnaces with combustion so perfect that not the slightest emission of smoke was visible from the chimneys. This, I am somewhat proud to add, was accomplished with a saving of fuel—as shown by careful test by Sir Frederick Bramwell, F.R.S., and also by

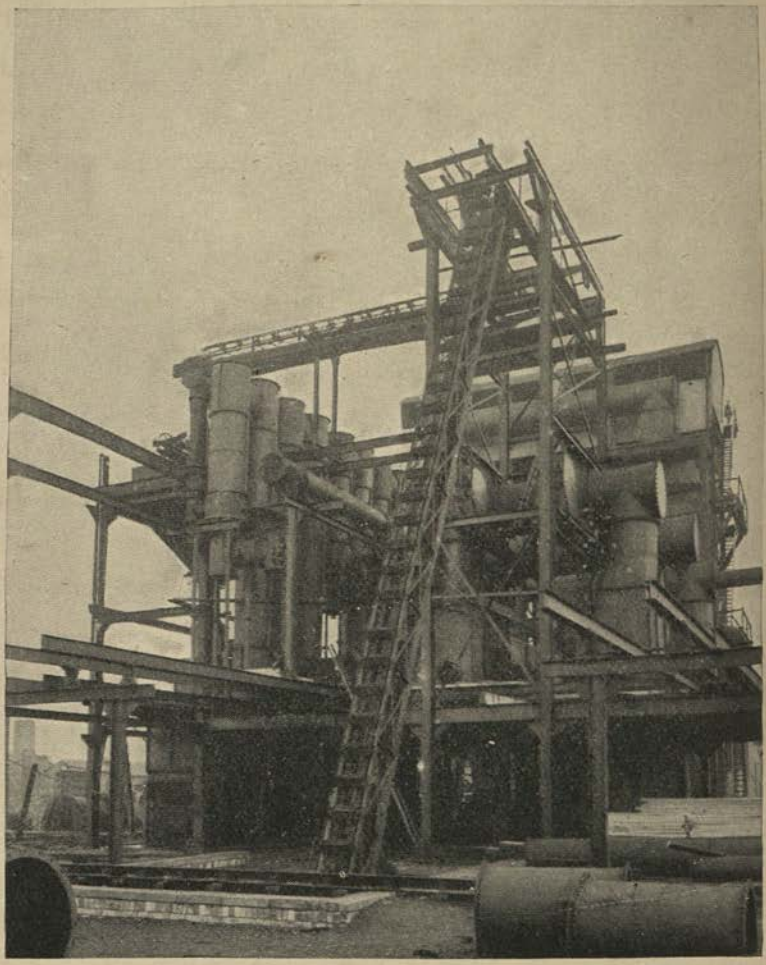
Professor Kennedy, F.R.S.—of no inconsiderable amount. On the other hand, I am sorry to have to add that practically no advance has been made with regard to the smokeless combustion of coal used for domestic purposes, and the growth of towns has but accentuated the great evil. Coal, indeed, is burned to-day in our densely-populated cities in a manner and with the same ill-effect it produced in the reign of King Edward I., when the evil was considered so grave that, in 1306, an Act was passed providing for the entire prohibition of the use of coal in London.

The use of coal in towns—with the disappearance of our forests—had again to be had recourse to, and from that day to the present its disadvantages to health and happiness have increased. It was not, however, until about 1880 that any light appeared to loom through the depressing difficulty, and this arose from a practical suggestion thrown out by that very able engineer and scientist, the late Sir William Siemens, F.R.S.; but until the present moment no opportunity has presented itself for carrying the bold idea into practice.

We are largely indebted to the Siemens family for the present position in which we stand in regard to the possibility of attaining a smokeless city. Like all great revolutionary movements, the development of cheap, weak gas production—originating, in the first instance, from the utilization of the waste gases from town furnaces—has taken much time,



View of Power Gas Plant taken from Top of the Producers.



Coal Elevators and Gas Plant.

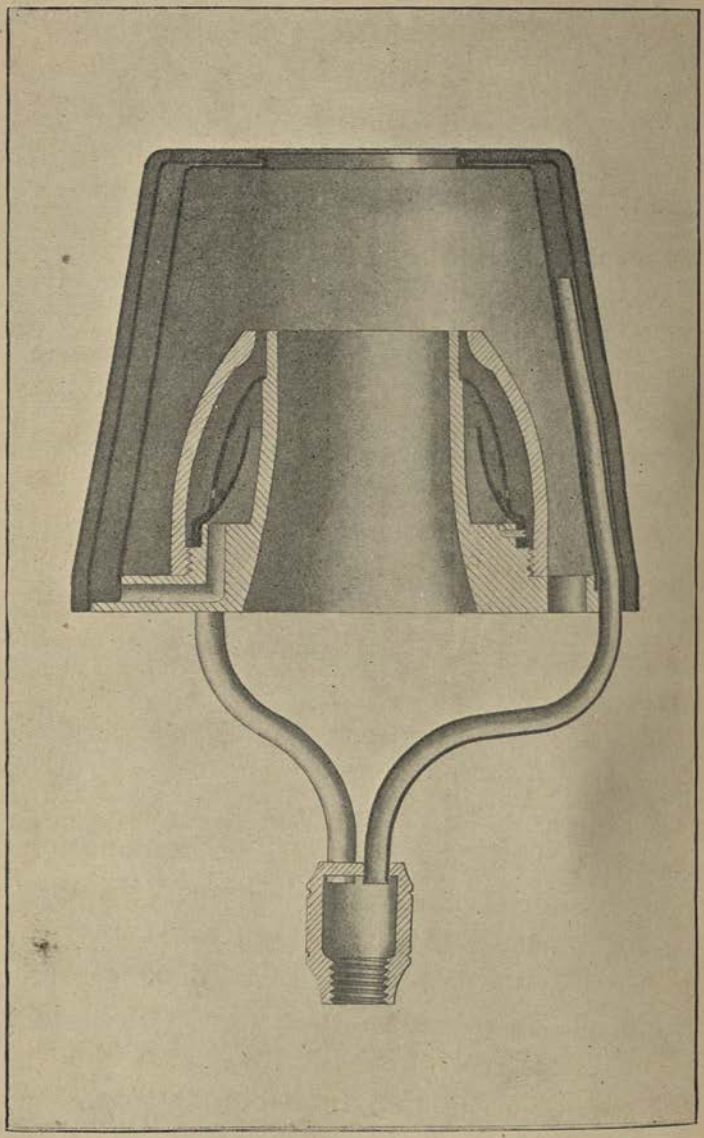
and the devotion of many minds; but it must not be forgotten that Charles William Siemens made the suggestion, as the outcome of the invention of gas 'producers' upon the part of his brother Frederick as long ago as 1856, as well as similar inventions by himself in 1861. Their work involved the introduction of the 'regenerative' principle which has played such an important rôle in industrial operations, and, indeed, does so in respect to the very latest types of gas-producers. Thus the brothers Siemens laid the foundation for the fabric of thought built upon the subject by that able chemist, Dr. Ludwig Mond, F.R.S., by whose researches and developments Garden City will be able to have its supply of industrial gas at a cost of about 3d.* per 1,000 cubic feet. This arises from the fact that Dr. Mond, after extended experiments, has been able to recover the ammonia in the form of sulphate of ammonia—a valuable manure. It may therefore prove interesting to append a table showing progress in gas-production as typified by Siemens' gas (1862), the much-vaunted British water-gas (1870), American water-gas (Lowe and Strong, 1874), Dowson gas (1878-1881), and Mond gas (1903).

* To prevent misconception, it should be pointed out that the calorific value—*i.e.*, the heating effect—of 'producer' gas is only little more than one-quarter that of retort gas; therefore, such gas at 3d. per 1,000 is equivalent to ordinary gas at 1s. per 1,000 cubic feet, seeing that four times the number of cubic feet must be consumed for a given amount of heating.

	Siemens.	British Water-Gas.	American Water-Gas.	Dowson.	Mond.	London Gas.
CO	25·97	31·86	35·88	25·07	11·00	7·80
H	0·65	54·52	52·76	18·73	27·50	52·90
CH_4	1·45	1·62	4·11	0·62	2·00	31·80
C_nH_{2n} + Benzol	—	—	—	—	—	5·00
CO_2	8·71	12·00	2·05	6·57	16·50	—
$N + H_2O$ ...	63·20	0·00	4·43	48·98	43·00	2·50
O	—	—	0·77	0·03	—	—
Total Combustibles ...	28·07	88·00	92·75	44·42	40·5	97·5

Siemens' suggestion was that the use of coal fires should be entirely suppressed, and that at the same time the distillation of easily manufactured non-illuminating gas should be undertaken, and this supplied and burned in scientifically constructed wholesome gas fires in the place of coal-gas, the latter being reserved for the purposes of illumination only.

The opportunity which now offers itself for the carrying into effect of Siemens' scheme and the achievement of a smokeless city is certainly unique. Hitherto it would have involved the laying down —at enormous cost—of special mains for the non-illuminating gas, as well as additional pipes for the dual supply within the houses and buildings. The advent of the incandescing mantle, however, will permit of its being carried out with a single set of mains and pipes, even should it be desired to make use of gas as an illuminant, a course, I feel, not likely to be followed in Garden Cities. This



The Sennett Regenerative and Compressive Gas-burner, for use with 'Weak' Gas.

Both gas and air is superheated in the surrounding chambers, and the flame becomes subsequently compressed and produces a brilliant white light, with the consumption of but one-half the usual quantity of gas.

remark, of course, applies specially to internal illumination. With regard to the lighting of streets, there is every probability that cities supplied with cheap fuel gas would by its means obtain an exceedingly cheap and effective means of street-lighting; for recent experiments have shown that quite satisfactory and reliable incandescing mantles can be made up to 2,000 candle-power.

In considering the effect of modern applied science in its relation to commerce, strange anomalies present themselves. One is observable in the fact that gas is always supplied to the public at less than its cost of production. In this and other relations the following table, compiled from the business of gas-supply of eight companies and eight corporations respectively, will prove both interesting and instructive:

The advent of the incandescing mantle had a sadly retarding effect upon the advancement of the electric lighting of interiors. This is regrettable from hygienic considerations. With regard to exterior illumination, if we can obtain the efficient and brilliant lighting of our streets, it matters little whether this be obtained by electricity or by gas. Economically, however, it matters much, for in transmitting the heat of fuel into light the electric illuminant involves a lengthy cycle of operations, the production of motive power, the generation of electricity, and such-like. With gas heat becomes converted into light directly.

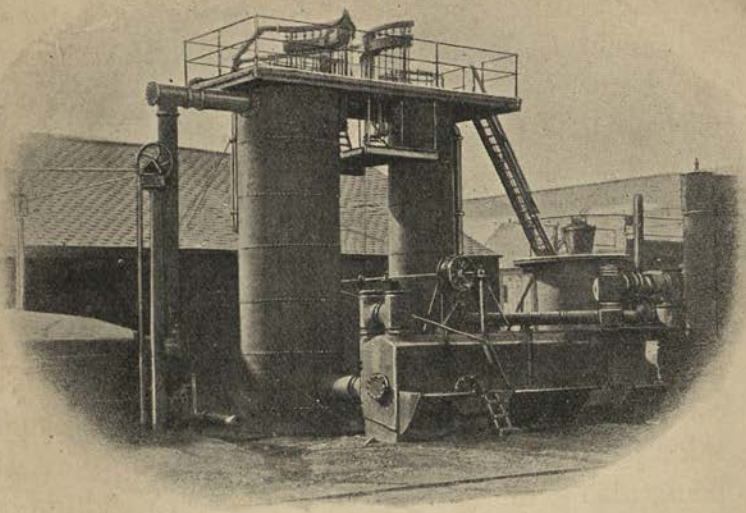
	A. Companies.	B. Corporations.
1. Total capital employed	£5,240,311	£10,005,206
2. „ per 1,000 cubic feet of gas sold	9s. 4d.	10s. 7d.
3. Coal and cannel carbonized, in tons	1,102,100	1,848,224
4. No. of private consumers supplied	235,888	511,492
5. No. of public lamps	39,159	76,423
6. Miles of mains	1,949	3,022
7. Gas supplied per consumer, cubic feet	44,649	34,696
8. Gas supplied per public lamp, cubic feet	18,919	15,722
9. Percentage of gas supplied to gas made	91·71	93·30
10. Income per 1,000 cubic feet gas	26·87	28·91
11. „ from residents per 1,000 cubic feet gas	9·44	8·59
12. Income from meters, stoves, etc.	1·54	0·56
13. Total income per 1,000 cubic feet gas	37·85	38·06
14. Cost of coal, etc.	18·27	17·95
15. Manufacturing charges	8·09	7·89
16. Distribution	2·89	2·66
17. Management	1·15	0·74
18. Rents and taxes	1·28	1·72
19. Law and Parliamentary ...	0·06	0·03
20. Bad debts	0·06	0·06
21. Other charges	0·09	0·05
22. Total working expenses, exclusive of public lamps	31·89	31·10
23. Gross profit per 1,000 cubic feet of gas	5·96	6·96
24. Annuities and interest on loan capital	0·80	3·79
25. Exceptional and other charges ...	0·15	0·17
26. Income from invested funds ...	0·08	0·08
27. Net profit	5·09	3·08
28. Total net profit	£238,649	£246,497
29. Sinking or redemption fund ...	—	£87,157
30. Relief of rates	—	£186,415

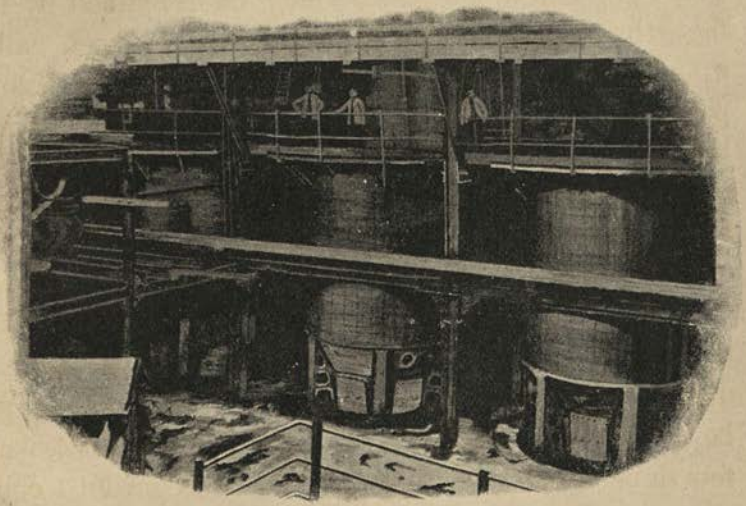
In the first place, it will be observed that the manufacture of gas and its supply to the public is a highly remunerative commercial undertaking, whether it be on the part of privately constituted companies under Act of Parliament or by Town and City Corporations under such authority. The profits are disposed of, in the case of companies, by payment of a dividend, the maximum of which is controlled by, and in each case specified by, Act of Parliament. The profits obtained by corporations are disposed of, after the setting aside to funds for payment of interest on capital borrowed and redemption, in accordance with the legal requirements, by apportionment of sums in relief of rates. In exemplification of the anomaly to which I have referred, if we take items Nos. 14 to 21 inclusive, we see that the average cost of production of gas by both companies and corporations is approximately 2s. 7d. per 1,000 cubic feet, whereas the income from the gas supplied averages but 2s. $2\frac{3}{4}$d. for companies and 2s. 5d. for corporations. It is noteworthy that corporations produce their gas, upon the average, more cheaply than companies (by more than $\frac{3}{4}$d. per 1,000 cubic feet), but it is equally noteworthy that the corporations' charge for gas is in excess of that of the companies.* The companies, on the other hand,

* In regard to this comparison, it should be mentioned that the figure comes out to the disadvantage of corporations by reason of the fact that the supply area of some of the companies —all of these being provincial—is far more advantageously situated than those of town corporations.

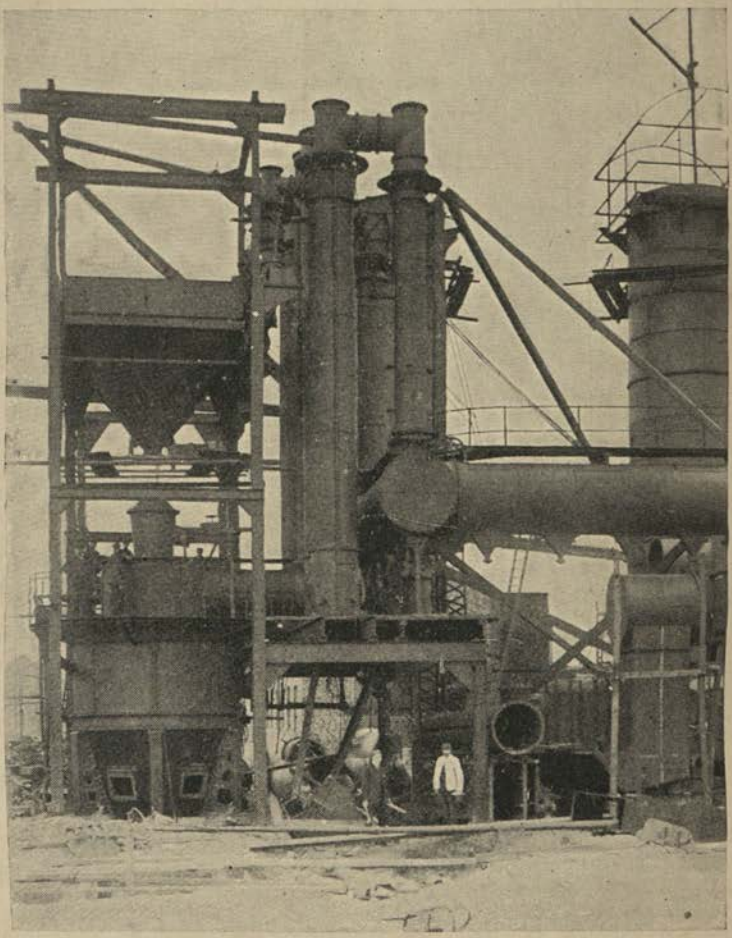
charge higher meter rentals, but give as a set-off better facilities for the employment of gas-stoves—a branch of the industry into which the companies have entered with far greater enterprise than the corporations. Corporations are more liberal in regard to the supply of their coke, charging on the average 2s. per ton less than the companies. They receive, on the other hand, better average prices for their tar, tar-products, and ammoniacal liquors.

The fact that the total capital employed by the corporations is so much greater than that of the companies shows that the average size of the undertakings is greater than that of the companies, this being also evidenced by the far larger weight of coal carbonized. The fact that the capital expenditure per 1,000 cubic feet in the case of corporations is 10s. 7d., as against 9s. 4d., may be explained by the fact that they have in many instances been called upon to pay out the interests of former private companies, and that such compensation tells disadvantageously against the corporations. In regard to item No. 9, the companies are apparently much more wasteful than the corporations. The manufacturing charges also show in favour of the corporations, as also, to a very pronounced extent, do the management and 'other' charges. The great discrepancy shown in item No. 24 should, perhaps, be commented upon. It is due to the fact that very few debentures have been issued in regard to companies, whereas corporations work entirely with





Power-Gas Producers and Ammonia Recovery Plant.



Gas Producers and Scrubbers.

borrowed capital. This also explains the discrepancy in item No. 27; for whereas the corporations have to pay the interest on capital out of gross profits, whereby the net profit is considerably reduced, the companies, on the other hand, have nearly the whole of gross profit to distribute as dividend. Out of the total net profit of 3d. per 1,000 cubic feet made by the corporations, one-third, being at the rate of 1d. per 1,000 cubic feet of gas supplied, is absorbed by the sinking fund, whilst the balance—equivalent to 2d. per 1,000 cubic feet of gas made—goes in relief of the rates.

Perhaps the point in the table which most immediately concerns Garden Cities is item No. 16, viz., the cost of distribution, which amounts to the large figure of nearly 3d. per 1,000 cubic feet of gas produced—in other words, to one-ninth the price at which the gas is sold. Of this great annual expenditure, the bulk is undoubtedly absorbed in the tearing up and reinstatement of the civic highways.

Let us now direct our attention to generation of electricity, with a view of weighing the value of coalition as between it and gas. The production of gas is essentially a chemical process, the generation of electricity purely a mechanical operation. Can the one be made to beneficially react upon the other?

At no epoch has applied science made such vast strides as during the century just elapsed since the introduction of the steam-engine, but it is not too much to say that presaging reverberations of the

death-knell of this time-honoured and exquisitely useful servant have already been heard in the throbs of the internal-combustion engine. Now, the—non-carburetted—gas I have referred to as possessing special merit as a culinary heat-producing agent is at the same time, an almost ideal fuel for the internal-combustion engine; and hence, unless the Boards of Management of Garden Cities be very badly advised, no coal-fired steam boiler will ever make its appearance within the rural cincture of the domain; nor will it ever be disfigured by the erection of a single factory 'stork,' or chimney. The claims of the liquid-fuel internal-combustion engine should, of course, receive due attention; but for simplicity I confine myself here to the interwoven production of fuel-gas and electric lighting. We may now consider that we have provided at once for the exorcism of the 'smoke fiend,' and the universal attainment of thermal ablution on a scale bearing favourable comparison with the standard of Roman bathing in the heyday of existence of the Eternal City, but with this great and essential difference—that the much-to-be-desired advantages will be available alike to rich and poor, instead of being denied to the latter. It need not be mentioned that in such cities Turkish, Russian, and all approved types of baths will find place, as well as a hydropathic establishment; but these will be self-supporting, and probably installed by private enterprise, and need not, therefore, be here considered.

The coalition of gas production with electricity generation I advocate would, moreover, place Garden Cities in a position to supply their factories with motor-power at a rate considerably below that at which its factory tenants could produce their own.

I will not here enter upon the considerations underlying the cost at which Garden Cities could supply electricity at a profit to them—involving many local considerations and much technicality—but will content myself with saying that, by means of this fuel-gas, electricity delivered at the switchboard upon the site selected would cost—allowing 10 per cent. profit to the Cities—under one-eighth of a penny, whilst the average fuel cost in existing stations (167) throughout the country exceeds nine-tenths of a penny.

The following table concerning the supply of electricity throughout the country may prove of interest. This also is compiled—from the data obtained from returns of the Board of Trade—from the working of eight companies and eight corporations respectively. Under Municipality and Monopoly I have touched upon Corporation electricity supply and the pros and cons of civic management, mentioning that where low-price electricity is supplied and a municipal profit shown, careful analysis of accounts may show such profit to be visionary. With the coalition of fuel-gas supply with electric generation from it, there can be no question regarding profit-making capacity.

	Companies.	Corporations.
1. Total capital employed	£4,293,767	£2,326,114
2. „ per unit of electricity sold	53·30d.	25·07d.
3. Total number of units generated	not stated	26,863,762
4. „ of units sold ...	19,332,960	22,263,696
5. Total income from public lighting consumers	£18,261	£3,327
6. Total income from supplying power to private consumers ...	£585,655	£293,107
7. Average income per unit sold ...	7·49d.	3·19d.
8. „ cost of maintenance, generation, etc., per unit sold	4·96d.	1·70d.
9. Average gross profit per unit sold	2·53d.	1·49d.
10. „ percentage on capital outlay	4·93	5·95
11. Average for interest on loans per unit sold	—	0·67
12. Average for sinking and reserve fund per unit sold	0·57	0·54
13. Net profit per unit sold ...	1·96	0·27

In the above table it is noteworthy that the capital outlay on the part of the companies is double that of the corporations. It must be mentioned as to items Nos. 2, 7, 8, and the other items dealing with the average per unit of current sold, that, as some of the companies failed to return the number of units supplied for public lighting, these figures are higher than they would be had the full return been made. Nevertheless, a careful perusal of the figures shows that the companies charge on an average double the price per unit of that of the corporations. With regard to item No. 5, the smallness of income from public lighting to corporations

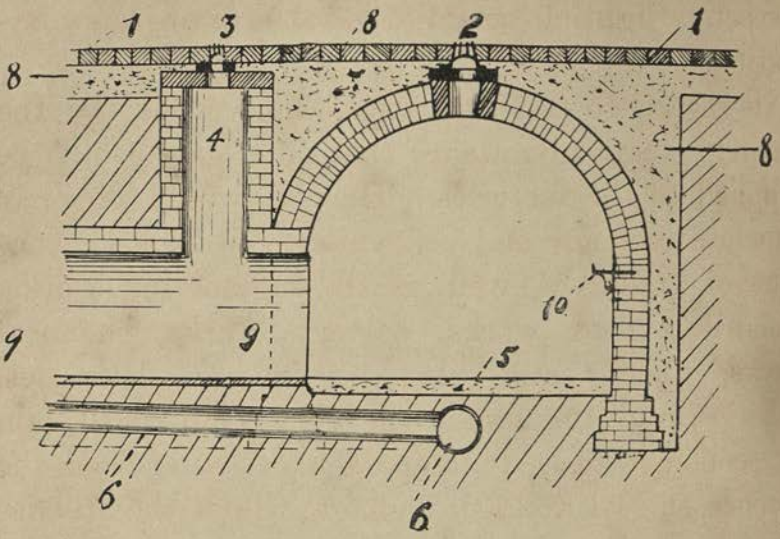


Fig. 1.—Subway at Nottingham.

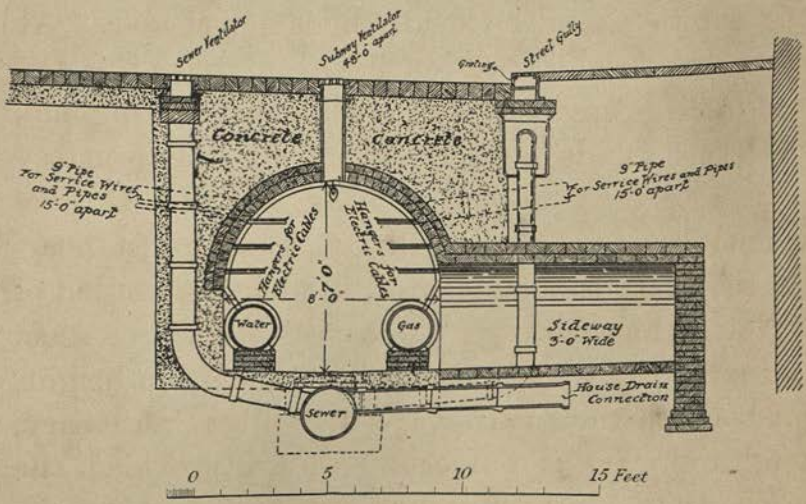


Fig. 2.—Subway at Leeds.

is probably accounted for by their supplying their respective lighting committees at a figure approximating to cost.

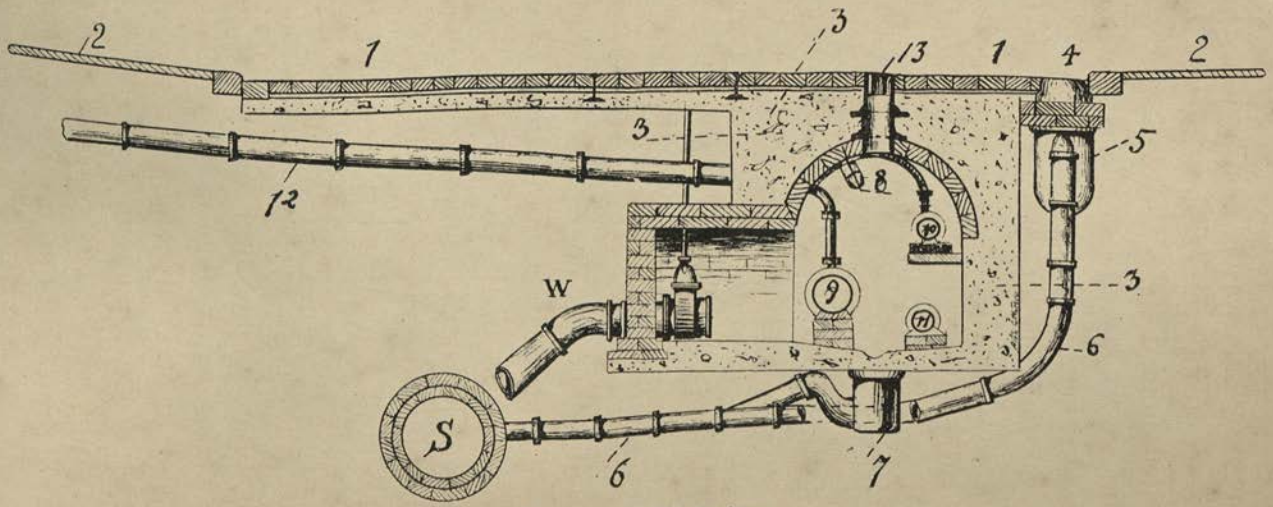
In regard to Garden Cities, there would be the further great advantage that fuel-gas could be supplied to the factories. Here it would prove of immense economy and convenience in almost every class of trade, as well as in engineering works, foundries, glass works, pottery works, chemical works, dyeing and bleaching works, laundries, bakeries, and the like. The City would also gain by economy effected in up-keep of roads from the absence of coal and ash haulage, whilst the absence of coal-vans and dust-carts would be appreciated by the inhabitants.

In a perfectly-designed City all mains should pass along subways, and be at all times get-at-able. At present but very few towns have entered upon the much-to-be-desired transition; they are Nottingham, St. Helens, Leeds, and London. By the courtesy of the respective engineers I am enabled to give sectional drawings of the subways in each instance.

In the Plate facing this page is shown a section of the Nottingham subway. It consists, as will be seen, of a tunnel 10 feet wide by 8 feet 6 inches in height, built beneath the roadway 1—1. Where necessary, lateral archways or culverts 9—9 are provided, the one shown having extending upwards from it the hydrant chamber, 24 inches square, shown at 4, the hydrant cover at 3. The walls of the tunnel are

14 inches thick, the whole being overlaid by a filling of concrete 8.8.8, by which it is consolidated, and which, at the same time, forms the bed or foundation for the carriage-way pavement shown. The tunnel is ventilated by gratings at the crown 2. The surface-water from the gullies is lead by pipes 6.6, to a drain passing beneath the 6-inch concrete flooring 5, of the subway, which can itself be thereby drained. The various services are carried within the subway upon suitable brackets, one of which is shown at 10. The subway was constructed to the designs of Mr. Arthur Brown, M.I.C.E.

The subway recently constructed at Leeds is shown in the illustration. The section of this is self-explanatory. It is situated, as will be seen, to one side of the carriage-way close to the curb. Its mode of construction differs somewhat from the foregoing, but it, also, is entirely encased in concrete. The gas and water mains are supported upon dwarf piers, as shown, and are hence very 'get-at-able,' the electric lighting cables, etc., being carried upon hangers as shown. Sideways, 4 feet high by 3 feet wide, are provided for bringing in mains every 40 feet, whilst smaller culverts for house electric connections are placed every 15 feet, these consisting of 9-inch pipes, one of which is shown in dotted line. The surface-water leaves the carriage-way by vertical apertures forming part of the curb, beneath which is a grid. These, I understand, have not been found convenient for cleaning, and are in future to have

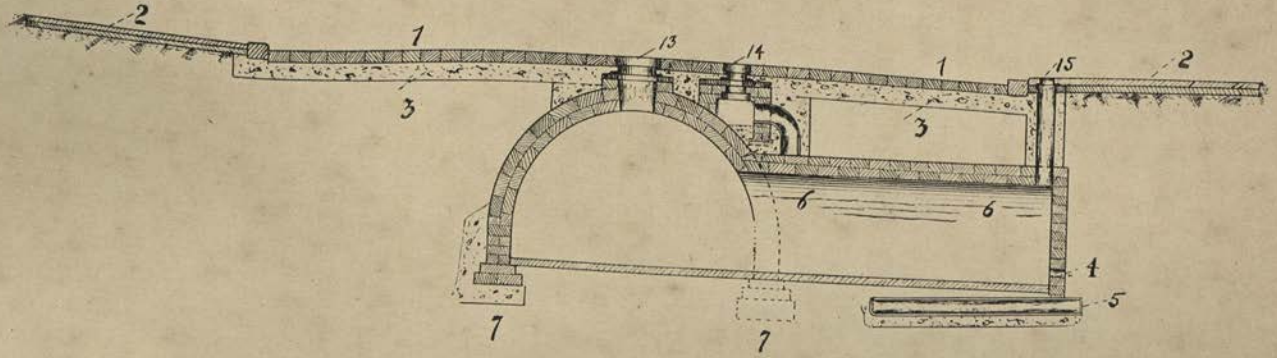


Subway at St. Helens.

movable covers. This water, trapped in the usual manner, passes from the siphon down into the sewer situated immediately beneath the centre of the concrete flooring, and accessible by means of manholes sealed with air-tight covers. The floors of the sideways are paved with brick-on-edge, laid dry so as to afford ready access to the house drains. The Leeds subway is 7 feet in height and 8 feet wide, and is constructed to contain gas and water pipes, telegraph, telephone, electric light, and tramway cables. It is ventilated by gratings in the carriage-way set 48 feet apart, and lighted throughout its length by incandescent electric lamps, one of which is shown in the illustration.

In the Plate facing this page is shown the subway designed and carried out by Mr. Geo. J. C. Broom, M.I.C.E., at St. Helens. The inception of this subway was brought about by circumstances very similar to those that will obtain in the building of Garden Cities, for the Corporation having purchased the horse-drawn tramway system, and decided to relay the tram-lines and equip them for electric traction, found themselves under the necessity of disturbing the whole of the street service for the purpose of constructing a new main sewer, as also of renewing the gas and water mains and services, and also laying cables for the electric lighting. It was therefore thought that a fine opportunity for so laying all mains that they could be 'repaired and renewed from time to time without in any way interfering

with the traffic and convenience of the business people after the work had once been completed' had arisen. They therefore decided upon, and had carried out, the subway shown in the illustration. The tunnel is constructed wholly of concrete, with the exception of a 4½-inch ring of blue brick to form the arch, round which the concrete was to be laid, such concrete forming, as in the other instances, the bed for the paving of the street. The subway is 6 feet 6 inches high, and 5 feet 6 inches wide, and is ventilated by means of open gratings 100 feet apart. Side openings, 14 feet long by 9 feet wide, through which gas and water pipes can be conveyed when required, have been constructed on the footpath, and these are covered with prism lights and means of access, together with fencing for protection during use. The subway is drained at frequent intervals by means of trapped gullies connected with the sewer, as is done at Leeds; but there is, further, a special valve inserted at the lower portion of the subway, to be used in emergency should a serious burst take place in the water-main. The subway is lighted throughout by electricity, all fittings and switches in connection therewith being water and air tight, so that in case of a leakage of gas the electric light may still be turned on without fear of an explosion. The lamps are 28 feet apart, and arranged in groups of five, with pilot lights between, the whole being controlled by main switches in the central chamber. The



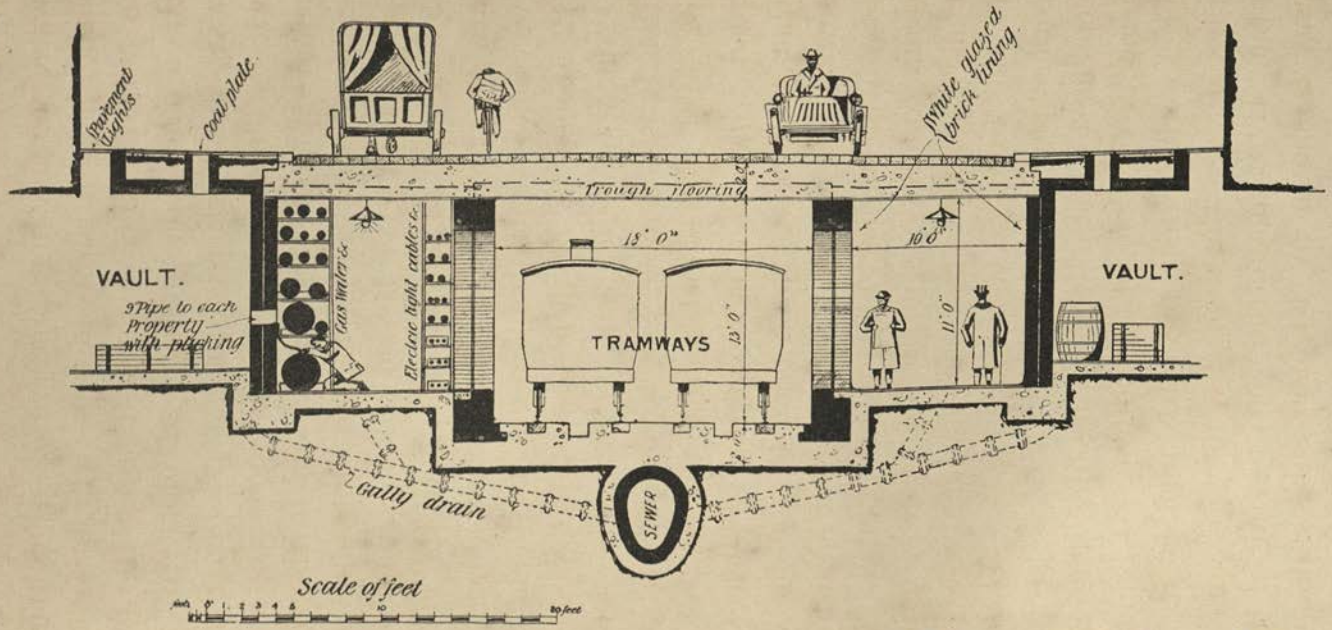
Subway at London (Tower Bridge Approach).

services for both gas and water are passed through 6-inch earthenware pipes—beneath the roadway where necessary—to the under-side of the curb on either side of the road. The work of constructing the subway, together with the laying of the gas and water mains and tram-lines and the paving of the streets, was carried out simultaneously. The positions of all intersecting streets are indicated by name-plates fixed to the walls of the subway.

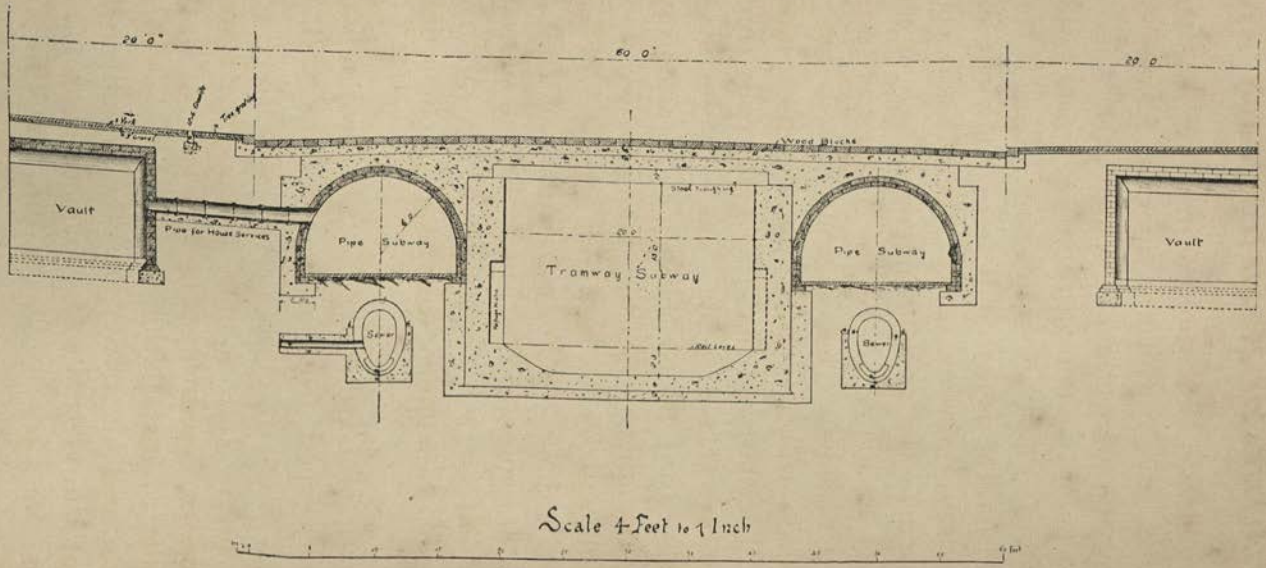
In the illustration the pavement of the carriage-way is shown by 1.1, that of the side-walks by 2.2. The concrete filling is shown by 3.3.3, whilst 4 represents one of the gulleys with its syphon trap at 5 and discharge-pipe 6.6 into the sewer S. The floor of the subway is drained by a similar syphon at 7. An electric lamp with its wire-guard is shown at 8, a water main at 9, electric main at 10, and gas main at 11. The emergency valve referred to is shown upon the inner end of the waste-water pipe W. The earthenware pipes referred to enclosing the gas and water service pipes passing beneath the roadway are shown by 12.

In the Plate is shown the subway constructed in connection with the Tower Bridge, London, beneath the bold (60 feet) road forming the southern approach. The tunnel is 12 feet in width by 7 feet 6 inches in height, substantially built in 13½-inch brick-in-cement, and is not embedded in cement, as previously described. A bed of this, however, surrounds the ventilators and the stone-

ware ventilating pipes, and is continued out to either side of the roadway—which is 36 feet wide—in a bed 9 inches deep, forming the foundation for the 5 inches deep hardwood blocks of the carriage-way, the York paved footways being each 12 feet wide. The tunnel is ventilated by gratings 24 inches square, placed at its apex and in the centre of the carriage-way, one of these being shown at 13. It is provided with lateral sideways, 15 feet long by 5 feet high, as shown at 6.6, at the ends of which are apertures for service connections. These sideways are ventilated by gratings—shown at 15—12 inches by 9 inches, situated just within the 12-inch by 8-inch curb stone. The sewer ventilation, it will be observed, is carried out by grids (14), placed 4 feet 6 inches from the centre line of the road, which is a more sanitarily perfect plan than that of placing these near to the footways. The sewers are situated beneath the subway, the floor of which consists of 3 inches gravel. The house-drain connections are made by 9-inch pipes set in concrete, a portion of one of which is seen below and to the right of the figure at 5. These, prior to connection, are closed by a disc stopper set in cement. These connecting lengths are situate beneath the floor of the sideway—which is of 9-inch brickwork, 3 feet in width inside—its end being carried over the connection by means of a small arch. Here, again, the wood-paving of the carriage-way is shown by 1.1, the side-walks by 2.2, the



Section of 'Kingsway' (Strand Improvement Scheme), showing the Triple Subway (a) for Service Mains, (b) for Tramways, (c) for Pedestrians.



Proposed London Subway (beneath 'Kingsway').

concrete foundation for the paving by 3.3, the tunnel footings by 7.7 ; whilst an aperture for electric (or other) service connections is shown at 4.

The latest subway—now in course of construction —is shown in the Plate facing this page. This is very interesting, from the fact that it is of sufficient size to accommodate tramway cars. It is being constructed concurrently with 'Kingsway,' one of the thoroughfares forming part of the Holborn-Strand improvement scheme. The diagram—which has a scale appended—will, I think, be found self-explanatory. It will be observed that there are really three distinct subways, the two side ones—for mains—being tunnel-shaped, whilst the central, or tramway, subway is rectangular, its ceiling being carried upon girders. This will be 20 feet in width and 13 feet in the clear in height. For particulars of this, as also for the drawings of the Tower Bridge subway, I am indebted to the courtesy of Mr. Maurice Fitzmaurice, chief engineer to the London County Council.

In the case of Garden Cities, the great advantages to be reaped from subway streets will be secured at a mere fraction of the cost they will entail elsewhere. Indeed, if a balance-sheet were carefully drawn, crediting the subway with the saving in cost of installation of the three essentials —gas, water, and electricity only—it would go far to show that the virtual cost of construction of the subways to the City would be *nil*. As this may

appear a surprising statement, I will refer to the considerations involved. I have mentioned the great cost of street-breaking in our large towns paved with granite 'setts' or wood-paving blocks, and upon this point the chief engineer to the London County Council informs me that this may amount to as much as £1 10s. per linear yard in the case, for example, of opening up to repair a water or gas main; this cost being made up of excavating the trench, refilling and ramming, providing new concrete for the paving foundation, and replacing the blocks. Now, the total cost of a large subway —say, 10 feet by 7 feet 6 inches brick-in-cement, including ventilators—would only be about £15 per yard run. Therefore, the mere operation of repairing a main would amount to no less than one-tenth of the cost of building such subway. But a subway serves for all mains; therefore we should have to credit it with similar items in respect of gas and electricity; therefore the one-tenth mentioned would be raised to three-tenths. From this it will be seen that the total cost of construction of subways would become repaid by saving effected in repairs done. It must further be remembered that street-breaking is almost constantly taking place for the purpose of connecting the various services to the mains, whereas, if subways be provided, all these connections are made from beneath the street and without inconvenience—indeed, without the knowledge of the inhabitants. Again, to detect

leaks in gas and water mains, etc., long lengths of roadway have frequently to be taken up at immense cost, whereas in a subway leaks can be immediately detected and attended to. But in a subway it is very improbable that leaks would ever occur, for they arise principally from subsidence of the bed upon which the mains are laid; when carried upon brackets or piers in a subway, however, such subsidence would be but a remote contingency.

Referring now to installation, the economy is immediately apparent. We may take it, from actual experience, that the cost of installing a water main, a gas main, and an electric main would be about 2s. per yard run for the two former and 1s. 4d. per yard run for the electric main, including the piers and brackets, as shown in the illustrations. Therefore the total cost would be 5s. 4d. per yard run. This, it will be seen, is less than the cost of running a single main in an ordinary road, which works out as follows:

	Per Yard. s.	d.
Removing macadam and excavating	1	10
Laying pipes	3	6
Making good roadway	0	9
Total	6	1

For the three services, therefore, the cost would be 17s. 6d. per yard run, as compared with 5s. 4d. for the subway. I have taken the case of a common road, such as we should find during the inception of a Garden City. But country roads in Garden Cities

will doubtless quickly disappear, and be replaced by highways paved in the latest and most approved manner. Therefore, if the employment of subways —the immediate installation of which I venture so strongly to urge—be postponed, then Garden Cities would in a short time find themselves in the predicament of our large towns. Looking to the annual cost to the City of the maintenance of such subways, we find it in favour of them, for it must be remembered that for some years, if they be not adopted, the cost of road-breaking to meet the requirements of continuous growth will be very heavy, the inconvenience incessant, whereas in regard to the subways the cost of their upkeep may be put at an exceedingly low figure; therefore one is principally concerned with the interest upon the money expended and the sinking fund. In regard to the latter, it will be seen that Garden Cities would stand at great advantage as compared with other towns. For in the case of ordinary municipalities the money could only be borrowed upon the condition that the sinking fund be such that it shall be repaid in thirty years. But thirty years as the life of a subway is, on the face of it, absurd. I am informed that, so far, they have cost nothing for repair, and the engineers conclude that this will obtain for a considerable time to come. As a matter of fact, there is no wear and tear whatever in a subway; the only thing that could happen to it would arise from a sinking of the ground through

some unforeseen cause; but as in most Garden Cities minerals will not be mined, this is indeed a remote contingency.

Engineers are of opinion that a hundred years would be a more suitable length of life to take, in which case it is obvious that Garden Cities would only have to set aside 1 per cent. for sinking fund, or less than one-third of that of other towns.

In relation to subways, it will also be seen that Garden Cities will stand at a great advantage from the fact that its land is virtually *terra natura*. The engineer will, therefore, be quite untrammelled. No artificial obstructions will be met with; no deviations will have to be made for existing pipes, drains, or other easements, and no monetary compensations will have to be paid. Moreover—and this is a very important item—no tunnelling will have to be resorted to; but, on the contrary, the steam navvy will have unhampered sway.

I have ventured to add my own design for a subway especially suited for a Garden City, and for embodying the advantages to be reaped from the special form of roadway I advocate in Chapter VII. This, which is illustrated in one of the Plates, will be found fully described in Chapter II.

The beneficial effect of coalition of the various departments of engineering science will demonstrate itself in almost all the operations incidental to the City—not the least in regard to those important factors in the prosperity of a City, the remunerative

supply to the inhabitants of those great essentials water, electricity, and gas—whilst it will materially diminish the cost of installation of the requisite plant and buildings required for such public services.

In regard to installation, the greatest saving will evince itself in connection with *distribution*, if the subway system of street construction I advocate be carried out. Beyond the three most important public services, great installation economy would be secured in regard to electric power supply, telegraphs, telephones, and despatch tubes, and other services for which the subways could be utilized.

Taking the three essentials only, we see that at the outset economy would manifest itself in the saving of time, and the usually heavy expenditure incurred in obtaining Parliamentary powers. For a City of the size proposed, it may be taken that, in the ordinary course, the cost of obtaining powers for gas and water works, together with a Board of Trade provisional order for electricity-supply, would amount to some £5,000, all of which would be saved.

The benefits of coalition will arise in a large measure from the fact that the Cities would undertake the public services, for it is well known, and a scientific fact, that the cost of production of commodities rapidly decreases with increased output. Thus, the City in making gas for public supply would at the same time make that necessary for all

its own motive power, such as in the generation of electricity, also for the public supply of power—the power required for pumping at its own water-works, that requisite in sewage disposal, and in the return of the deodorized effluent to the market gardens. Saving could also be effected in numerous other ways, including income from bye-products, such as artificial manures,* which could be applied to its own lands, to the benefit of the City and that of its tenants. In all of these, apart from economy in production, distribution—which, as I have mentioned elsewhere, is a very serious item—could be very favourably dealt with in Garden Cities, if serious and careful thought be bestowed upon it from the outset.

By these remarks I trust I may have shown that, except in cases where very cheap water-power may be available—*i.e.*, under normal conditions obtaining in our islands, and in the present state of development of applied science—the most economical and hygienically perfect method of lighting, heating, and smoke-prevention in a new city is to provide for the collective or simultaneous supply of non-illuminating gas together with electricity. Space will not permit of my going deeply into the employment of these two agents in industrial occupations, and I must content myself with the remark that, if due

* Cheap gas is partially due to the return from sulphate of ammonia recovered from the 'slack,' or coal-dust, used in the producers.

forethought be bestowed upon it and apposite provision made, all the industrial occupations and processes likely to be carried out in Garden Cities will be conveniently and economically practicable, without the necessity of any atmospheric defilement from the employment of solid fuel.

Thus far I have only touched upon the potentialities of applied science as we have it to-day—but in less collective fashion—in our own country, and in so doing I have refrained from anything speculative. But there are other countries than ours—countries the inhabitants of which—be it said to our shame—have appreciated with far firmer grasp and more intelligent prescience the true value and potentialities of technical education. What would Garden Cities have in store for them? what would the whole of Great Britain and Ireland have in store were we to take due advantage of this so lamentably neglected—it were not too strong to say scandalously neglected—branch of education? This, unfortunately, applies not only to manufactures, but to agriculture also.

I have referred to the value of the land of our country when in close proximity to large towns; but what is the value of such land if it be not tilled with the brain as well as the hand? Land around Paris, for example, is of greater rent-returning value—militating to the prejudice of the producer—yet the industrious French market-gardener—working his constricted plot with his brains as well as

his hands—is enabled to send *his* products to *our* country, and to live in Paris upon the profits these bring him from London.

What would Garden Cities have in store for them if all around their fringes the land were tended with but a fraction of the care and solicitude it receives at the hands of the French peasant, the Dutch and Danish dairy-farmer, the technically-versed German agriculturist, the American 'truck' grower, and the laborious Switzer?

It is generally assumed that what attracts the market-gardener and so greatly enhances the value of land in the vicinity of large centres of population is the markets. But I have just referred to a case where the products of land lying around the walls of the capital of one country are sold and eaten in the capital of another country. One may well ask the reason for this astonishing fact. The answer is: Technical education, science, and the intelligent application of it to the land.

Let us take this surprising state of things as an example of the potentiality of applied science in a Garden City. The enhanced value of land around a town arises largely from the facility with which stable manure can be obtained. Now, why does the 'intensive' market-gardener put stable manure upon his plot? To fertilize it, one might say. Not so. His science induces him to use more appropriate, though more artificial, means of fertilization to fulfil his requirements in intensive culture. He puts it upon

his plot to *warm* the land; and to maintain the soil at a certain temperature, he expends much thought, ingenuity, and empirical art in combining different kinds of manure, and upon the most suitable mixtures, that they shall ferment at a given speed, and thus produce the desired result. But Science, to whom he is always alert to listen, whispers to him that there are other and simpler means of heat production, and he promptly installs his hot-water pipes and thermosyphonically warms his land in a manner both scientific and economically efficient.

Too much is said among us of the 'poorness' of the soil. To the scientific horticulturist the soil is but a vehicle, like that of the painter. The science-trained culturist will *manufacture* his soil—sawdust, old hemp, and leaf mould will serve him very well. He finds that with machinery he can make *any* soil, and of any desired composition. To such an art has this already been carried that it is now a usual stipulation in the contracts of tenure of the Paris *maraîchers* that the market-gardener may, on quitting his tenancy, carry away his soil with him, down to a certain depth.

Now, what is the effect of applied science in this relation? It is that the land is made to yield a hundredfold its normal output and a monetary income far in excess of anything achieved in our own country. We, unlike the industrious Switzer, who must needs 'force a churlish soil for scanty bread,' merely abandon it and allow it to go out

of cultivation, showing much lack of pluck and enterprise in comparison with our foreign competitors. At Montreuil, on the outskirts of Paris, for example, 750 acres, belonging to 400 gardeners, are closely intersected with stone walls erected for fruit culture, and having an aggregate length of over 400 miles. The amount of capital invested abroad on small plots of land is also quite surprising. For example, upon only two and seven-tenths acres worked by M. Pouce—an authority upon this mode of culture—the initial outlay for plant, including a steam-engine for watering, was £1,136. The expenditure for manure alone is over £100 per annum, the rent and taxes for the small plot upwards of another £100 per annum, yet the return is an extremely handsome one.*

Comparisons of this nature might be multiplied and taken from all countries, to the belittlement of ourselves. I have taken this merely as an example. But what can be done in France can be done in England, and from these remarks an idea can

* The products are too numerous to be set out *in extenso*, but we may mention the chief items: More than 20,000 pounds of carrots; more than 20,000 pounds of onions, radishes, and other vegetables sold by weight; 6,000 heads of cabbage; 3,000 of cauliflower; 5,000 baskets of tomatoes; 5,000 dozens of choice fruit; and 154,000 heads of salad; in short, a total of a quarter of a million pounds of vegetables. The artificial 'making' of the soil is well exemplified here, for every year, due to the making up of the soil from forcing beds, no less than 250 cubic yards of loam had to be sold.

be obtained of the value the agricultural fringe around Garden Cities could be made to attain to.

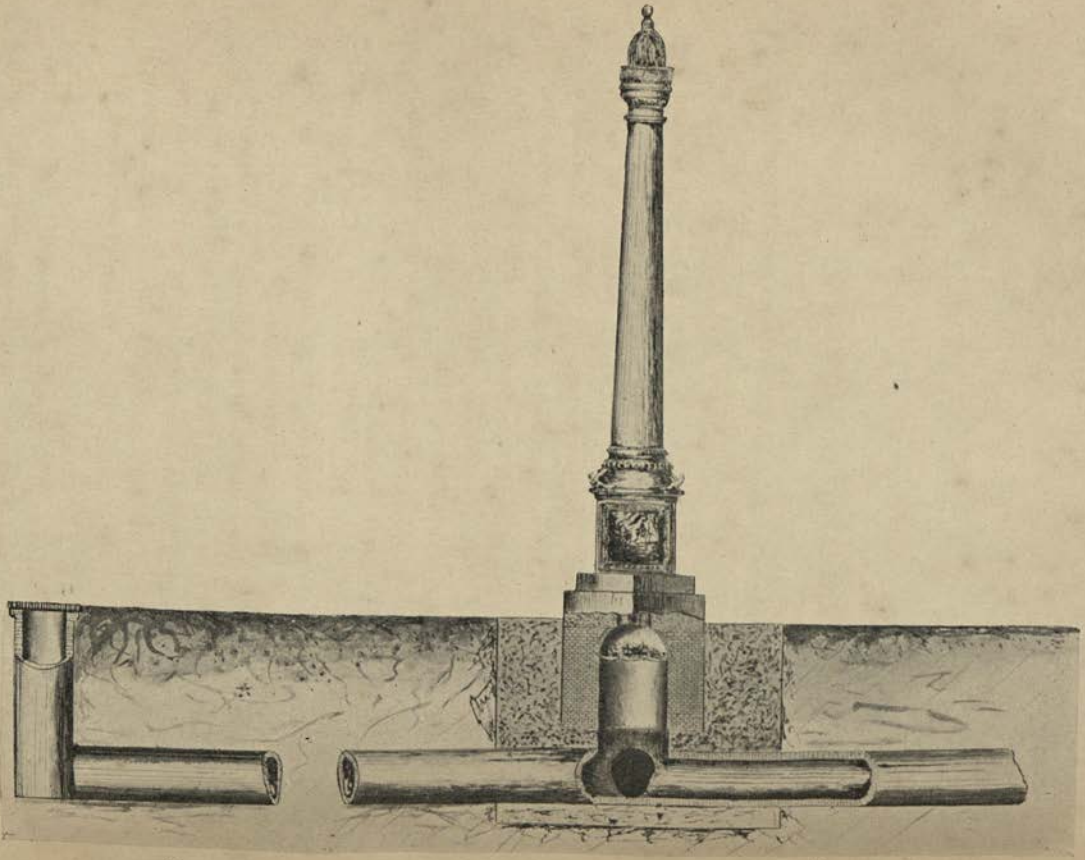
But this mode of working the land requires an abnormal capital expenditure. This, in the present depressed condition of agriculture, the farmer would be unable or unwilling to face. What is wanted is a good object-lesson in our midst. The surprising and highly gratifying results of ordinary hothouse culture in our own country, as exemplified at Worthing and in the Channel Islands, most distinctly points to the advisability of this being done. And it should be done at once. I do not know of anything in which capital could be more judiciously launched than in this direction, and therefore I would suggest that Garden Cities—which could offer facilities existing towns do not possess—should not only let land at fair rental for such culture, but that they should dispose of the capital difficulty by erecting the hothouses, and letting to carefully selected tenants—those likely to do justice to the facilities afforded—these aids to intensive culture. That, moreover, these hothouses should be not only heated from the cheap gas, to which I have referred, the installation being such that an equable temperature shall be maintained automatically, but that the City should supply these buildings, after ten o'clock at night, with electric light at an exceedingly cheap rate, so that continuous growth, resorted to by other countries, but neglected by us, might be introduced into such object-lesson.

Seeing that what applies to market-gardening also applies to agriculture—for the output of scientifically tended farms has elsewhere been equally surprising—I would go farther, and suggest that Garden Cities should offer, rent free, to an association of men well acquainted with the branch of science involved, a number of acres of their land conditionally upon its being worked under their supervision and guidance, in accord with the latest dictates of science; for the object-lesson in intensive farming they would present would bring about a manifold enhancement—a well-earned instead of an unearned increment—in other portions of the ruro-urban land.

To conclude. In the words of H.R.H. the Prince of Wales, 'England must wake up.' It may be humiliating to our pride that we should have to learn from others who have outstripped us, humiliating to reflect that we should have ignored alike the hints of the British Association of Science and the warnings, the entreaties, and the admonitions of our savants. Such, unhappily, is the case. We are in an unhealthy condition in regard to our agriculture, as in regard to many of our industries; our functions in competitive and intensive culture are ill performed. It were more plucky to swallow the bitter pill of tonic, and the sooner the better.

The humiliation will not be increased by our now following the object-lessons of the more astute,

whilst it will be wiped out when we retrieve our lost ground and surpass them. It will indeed be gratifying to all if the necessary and much-desired 'waking up' should be brought about by the practical demonstration of the potentialities of applied science in a Garden City.



Sennett System of Sewer-gas Exhaustion and Microbe Destruction.

APPENDIX TO CHAPTER IX.

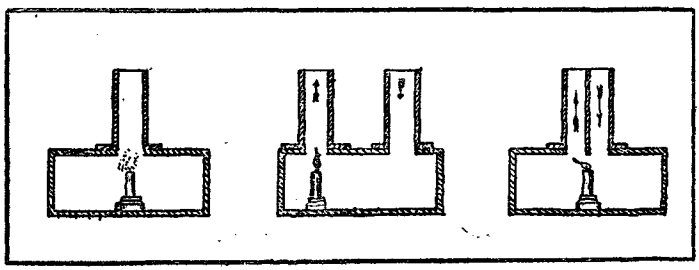
NOTE ON THE EVACUATION OF SEWER GASES AND DESTRUCTION OF THE MICROBES.

In Vol. I. I have ventured to point out that the present system of allowing sewer gases to pass into the streets is exceedingly faulty in regard to hygiene, and is, moreover, the cause of much ill-health in cities. The ideal system would be one in which a partial vacuum would be made and maintained in the drains. Were this principle adopted, no leakage of sewer gases into dwellings or into the streets could take place. Such evacuation could be produced in several ways, but for the system to be perfect no sewer gases should be allowed to pass into the atmosphere until they had been burned.

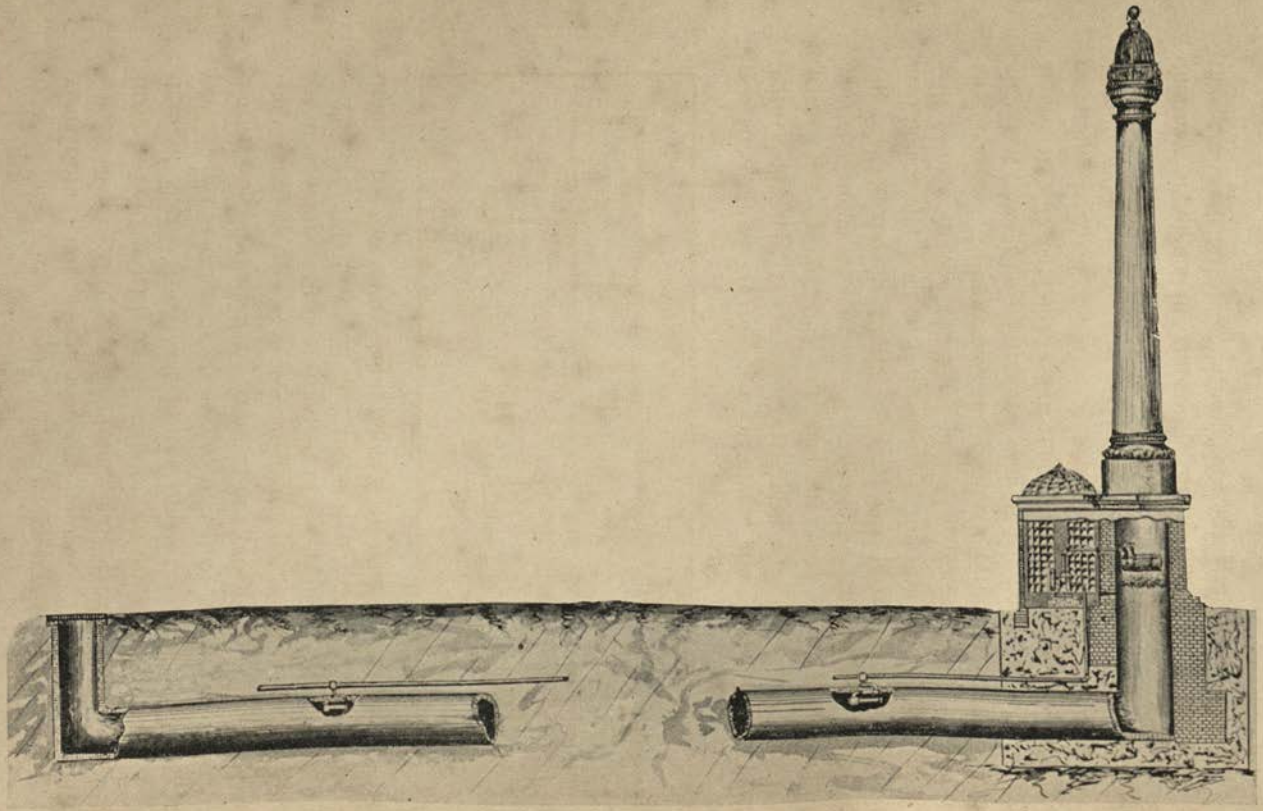
In the accompanying diagrammatic illustrations I show a simple mode of carrying out this system of sewer ventilation and germ destruction. In it no machinery is required. At the central, and preferably highest, point an ornamental chimney-stalk would be erected, and this might be made to form the tower of the Capitol. The base of this chimney would be connected by a large culvert with the main drains. In the throat of the chimney—above the entry of this culvert—would be a flooring composed of ordinary furnace bars. On these would be spread a thin fire, about as thick as that in an ordinary steam-boiler flue. This furnace is shown in the diagram, and the culvert mentioned connecting the chimney with the sewers. The latter would not be provided with any ventilators or gratings in the streets, as

now obtains, nor would it be necessary to have sewer-gas ventilators in connection with the houses. The sewers, instead, would be provided at their lower ends with ventilation shafts, furnished either with dwarf-walls or gratings, as shown. These draught shafts would act in the opposite manner to those at present in use; that is to say, a current of fresh air would pass downwards, instead of a current of noxious gases rising upwards, the volume and speed of the inflowing air being in proportion to the area, temperature, and height of the ventilating chimney.

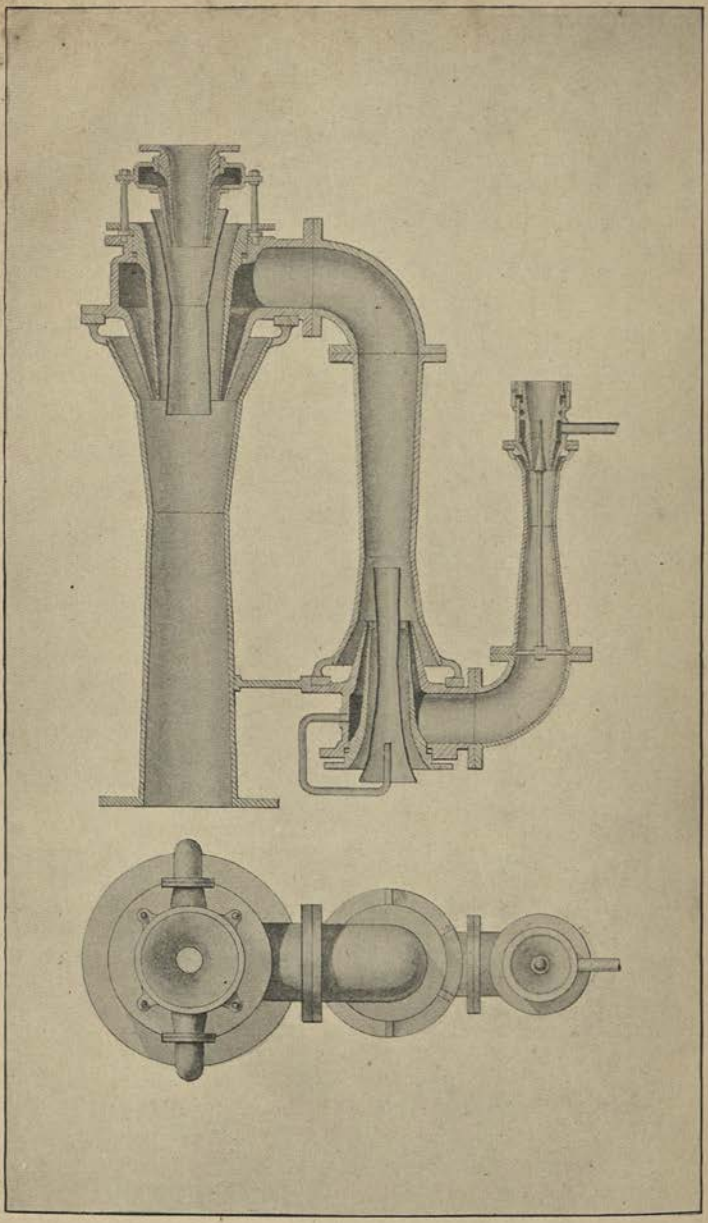
The principle involved and the action taking place would be similar to the experiment shown in the illustration. Here



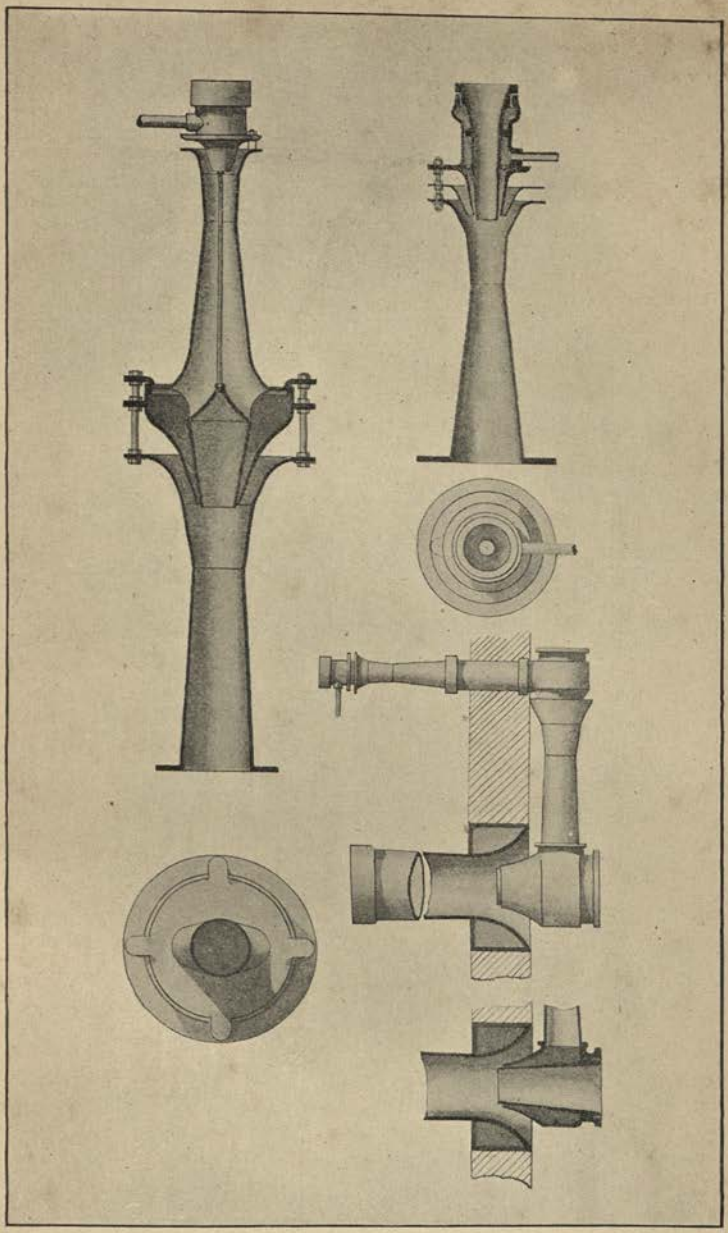
are three precisely similar chambers, the first being provided with a chimney, the second with two chimneys, and the third with a duplex chimney—*i.e.*, one provided with a diaphragm or partition down its centre. If a candle be lighted and placed in the position shown, it will be found that no efficient circulation will be set up; but, on the contrary, the products of combustion will remain in the chamber, and the candle will become extinguished. If, however, the candle be placed in the second chamber, having two chimneys, and in the position shown in the figure, it will be found that there will at once be set up an ascending current of air in the chimney above it, with a corresponding descending current in the non-heated chimney. The conditions obtaining are precisely those of the furnace and chimney arrangement shown in the larger illustrations, except that the ventilating efficiency becomes greatly accentuated by



Sennett System of Sewer-gas Exhaustion and Microbe Destruction.



The Sennett 'Transformer,' Aspirator, and Blower for Evacuating Large Capacities.



The Sennett Aspirator, with the Exposed Parts made in Earthenware, for use in Acid and Corrosive Atmospheres.

increasing the length of the hot chimney and reducing that of the cold one. In the case of the cavity having a chimney divided by a diaphragm, this is precisely the method adopted in the ventilation of coal-mines.

In the experiment it will be found that the candle will choose one or other of the exits as its 'up-cast' shaft, and a current will be established, as shown by the arrows. In practice the partition is formed by what is known as a 'brattice'-cloth, the furnace being so situated as to warm the air in one side of the shaft only. In the second case shown—that precisely similar to the system I advocate—it will be noted that fresh air is drawn down into the cold shaft, and if smoke be made by burning brown paper in the vicinity of the apparatus, it will be found that the smoke is immediately drawn down into the cavity—representing the sewers—and rapidly discharged up the little chimney—representing the furnace shaft.

In the case of lengthy sewers and those having 'falls' in different directions, furnace evacuation might be supplemented by pneumatic aspiration. In the accompanying illustrations is shown a form of aspirator and blower designed by me some years ago for the purpose of shifting large quantities of vitiated air. It was styled a 'transformer' aspirator, because the energy of a small stream of high-speed steam or compressed air was transformed into a low-speed flow of great volume of evacuated air. The Sennett transformer aspirator and blower is shown to larger scale in the accompanying illustrations. Such apparatus could conveniently be made use of when necessary, as shown at the broken-out portions of the drains in the second illustration. The compressed air requisite for their use could conveniently be produced by an air compressor worked by steam raised economically in a boiler heated by the 'suction' and microbe-cremating furnace.

Referring to our ordinary system of drain ventilation by means of ventilating pipes upon the houses, and arranged as lamp-posts in the streets, the conditions obtaining, though serious, are thus breezily referred to by a very intelligent newspaper (the

Globe): 'Sanitary experts, dreaming of fresh worlds to conquer, have lately started the serious question as to whether much good results to public health from conveying sewer gases to the upper air. So long as their temperature continues higher than the surrounding atmosphere, the desired object is attained. But after a brief while they descend, to fly in at open windows and doors; and to catch unsuspecting wayfarers hurrying, open-mouthed, to keep appointments. If, therefore, any germs of disease have lurked below ground, they have as good a chance of doing their deadly work as when the only ventilation was through an iron grating. That, at all events, is the current theory among specialists, and it certainly presents an arguable appearance. But, when admitting its accuracy, what is to be done? It would not be practicable to convey the objectionable gases to the altitude of Mount Everest, while the greater the height at which they were let loose, the more rarefied the air would be, and the quicker would be their descent. All that can be accomplished is for crowded populations to rid themselves of sewer germs by carrying them so high as to insure their being blown away to the country before coming back to earth. But that might seem a little hard to the countryman.'

The conditions are quite correctly set out in this extract; but the important thing—the solution of the problem—is not ventured upon, the writer contenting himself with the exclamation of despair, 'What is to be done?'

I venture to suggest that what should be done is that a system substantially that I advocate should be adopted. In that case, it will be observed, not only would our houses and our thoroughfares be rid of sewer-gas emanations, but also the 'countryman' would not suffer at the expense of the town-dweller, because all noxious germs would be *cremated and destroyed* before being thrown into the upper atmosphere.

CONCLUSION

'How is it, it may be asked, that while our wealth is increasing, poverty and misery is increasing also? To this some will reply that there is a tendency in population to increase faster than wealth. If so, we must submit. But, we must also ask, may there not be certain errors in our economical system which prevents wealth from accumulating as fast as population? For throughout all the works of creation the means are so well adapted to the end that we may naturally suppose it must be the order of Nature that these two should progress together; and that in any country where they do not it must be the consequence of not following Nature's laws.'

'Logical consequences are the scarecrows of fools and the beacons of wise men.'—HUXLEY.

'UTOPIAN speculations!' that is the derisive comment with which many, I fear me, may close these pages as they may have done those of the book referred to in the 'Prefatory.' For, inexplicable as it may appear, there is a large section of all publics who always believe that their best interests are interwoven with the existing state of things. This arises from two causes—(*a*) the vast number who never trouble to think at all, and (*b*) those whose invariable mode of reasoning is, 'We have done fairly well as things are: why have any change?'

It is this spirit of *laisser faire* which—somewhat characteristic of the British—is the cause of our holding to-day a less exalted position in the prosperity of nations than we ought to have done. These, however, are more or less harmless, and might be styled—in the true significance of the term—'passive resisters.'.

To these, unfortunately, have to be added two other classes—more pyrotechnic—in their nature: those who gird on their armour to do battle with *any* and *every* innovation simply because it *is* an innovation, and those who spend prodigies of cerebral labour upon *proving* every suggestion of *anything* and *everything* new to be an *impossibility*—people whose loud voicings are hushed in singularly effective manner by the carrying out of the projects in due course. Of such, endless examples might be cited.*

I am rendered happy, however, by two considerations—(*a*) that the pensive and enlightened are upon the side of judicious innovation, and will see in these pages merely suggestions for the adaptation of applied science to everyday life and comfort, and (*b*) that the effects of technical education are now becoming

* 'The celebrated Dr. Dionysius Lardner, editor of the "Popular Cyclopædia," gave a public lecture in England to demonstrate the utter impossibility of a steamer crossing the Atlantic, and within a short period after this was himself conveyed as a passenger to America in a steam-packet, thus performing in person one of those very voyages which he had "demonstrated" to be impossible!'

felt; from that cause a vast accession to the ranks of sympathizers with such adaptation is being recruited. All should remember Lord Bacon's admonition: 'A froward retention of custom is as turbulent a thing as innovation, and they that reverence too much old times are but a scorn to the new. He that will not apply new remedies must expect new evils: for Time is the greatest innovator; and if Time alter things for the worse, and wisdom and counsel shall not alter them for the better, where shall be the end?'

Then, again, there is that extraordinary view to be combated, held by those who may have sympathized with a certain movement, that that innovation is *perfect for all time*—that it continues to remain so no matter what changes may subsequently take place. How utterly illogical such views are is seen directly one reflects that the conditions of the particular innovation were framed and formulated expressly to meet or counteract contemporaneous conditions. Now, should the conditions of an epoch subsequently become changed, non-existent or be reversed, *ipso facto*, the balancings of the innovation must become upset, and, in consequence, its *raison d'être* destroyed.*

* Quite ludicrous exemplifications of this queer reasoning have recently exhibited themselves in connection with the proposal to readjust our fiscal relations. The perfectly reasonable and absolutely justifiable suggestion was made that—things being unsatisfactory—our position should be reviewed, and for that

If now we desist from the absorbing but mind-dwarfing occupation of 'ploughing our lonely furrow' —this oft-times in antiquated fashion—and take a world-embracing survey, we shall at once appreciate that the balancings of a past epoch *have* become upset, utterly changed, and in many cases reversed. We shall appreciate, moreover, that energy expended in a continued prosecution of our work, by obsolete methods, and under changed conditions to which we have not adapted ourselves, may become ill-expended energy.

Success, by reason of the frailty of human nature and the want of prescience in man, is usually not a wholly unmitigated blessing. For it oft-times breeds within the individual an unwarranted sense of self-sufficiency, a super-exalted estimate of might, and a dangerous contempt for adversaries. But what is

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purpose inquiry should be made. Whereupon the Chamber of Commerce of one of the most important manufacturing towns in the country positively passed a resolution denouncing any such inquiry. Stranger still, at the time when the Town Council were so uselessly spending their time—behaving, indeed, in such uncourageous and ostrich-like fashion—great distress prevailed in the town, due to the shutting-down of mills manufacturing the staple which erstwhile had built up the prosperity of their huge town. Surely to such an instance the words of the Marquis of Montrose aptly apply:

'He either fears his fate too much,
Or his deserts are small,
That dares not put it to the touch
To gain or lose it all.'

true of individuals is true of nations, and when we, dispassionately and as far unbiassed as may be, critically and carefully review our national position, we are constrained to admit that a sentiment embodying excess of confidence in ourselves, coupled with a too meagre estimate of the abilities of others —contempt for our adversaries—*has*, during the last two or three decades, been responsible for a serious loss, if not of national prestige, of a large measure of our commercial superiority.

The questions we must needs ask ourselves are, Is this loss to continue and bring commercial ruin in its train? and, Can we stave it off by internal remedial measures? Careful thought must cause us to give a negative reply to both.

In the foregoing pages I have ventured to assert that the day for the useful discussion of the industrial economics of a nation is passed and become next to valueless. For no scheme, thesis or principle can be of utility or practically workable which is not founded upon a basis formed from the data derived from subsisting *international* conditions. I desire to reiterate and to impress this. For, if it be overlooked, we shall assuredly find that the benefits which could otherwise be made to accrue from a change of conditions due to industrial decentralization will be largely vitiated. If we are to retrieve our supremacy, or indeed to re-establish ourselves upon a firm commercial basis, are to build new and improved Cities in which capital can be invested

and safely and profitably worked, we must LEARN TO THINK BOTH IMPERIALLY AND INTERNATIONALLY. We must, moreover, be prepared to conform to such changes—be they industrial, social, commercial, or fiscal — as time has wrought; changes to which others, less self-satisfied but of greater prescience, have already found it beneficial to conform.

Concurrently therefore with the inception of the innovation treated of in the foregoing pages, our thoughts should be as absorbingly devoted to the betterment of ourselves as a Nation. For without proper international trading relations the very essence of the object aimed at in the establishment of Garden Cities is rendered impossible of achievement. The object should be not only to improve the conditions under which our industrial units shall dwell and carry on their work, but also to largely increase the amount of work available for them to engage in.

Return to the land! that is the admonition involuntarily rising to the lips when contemplating the toilers of our great cities and noting the baleful conditions under which they exist; and it is sad to reflect that it were inutile to give it expression, for we know it to be impracticable under existing conditions of our greatest of industries—Agriculture. 'The return to the land,' nevertheless, is both the admonition and the sheet-anchor of these well-meaning, well-doing pioneers of social amelioration who

strive to provide non-terrene employment beyond the walls of our overcrowded hives of industry.

At a moment when the decadence of British Agriculture is giving rise to grave fears as to its effect upon our national safety; when, indeed, a Royal Commission is sitting to consider our position in regard to food-supply in time of war, the consideration of industrio-agricultural problems is most appropriate; nay, it behoves us to consider if the proposed 'town-country' occupation could not be made to react beneficially upon Agriculture; if, indeed, the expenditure upon Garden Cities throughout our islands would not be more nationally beneficial than that upon vast granaries and store-houses for the produce of other countries. The consideration, however, of this branch of national—or rather international—economics cannot be entered upon without stepping into the domain of politics, and I must therefore not pursue it here. But, though I am debarred, I may be permitted—and this most earnestly—to conjure all well-wishers to the innovation, as well as all true patriots, to shirk not the vital problem, and to sink party politics during its grave consideration.

Under an entirely erroneous impression that our country was making vast strides in industrial progress consequent upon the removal of certain protective measures it was thought advisable to remove—but which in reality were due to the then recent introduction of steam-power to mills and steam

railway locomotion to transport—we have very properly lauded the well-intentioned statesmen who wrought the change. But these good men were mistaken in one important thing : they were at fault in their estimate of human nature. They sincerely and fervently believed that the object-lesson they were offering would convert all the world—their opponents—to their own views, and thus 'free trade' would have become universal. Their prognostications, unhappily, were falsified, the result being that 'free trade' was never brought about, and we find ourselves to-day 'free importers,' debarred from participation in 'fair trade.'

It boots not what and how pure and correct soever the principles underlying the basis of Free Trade may be—in which doubtless we nearly all agree—if it exist not, we can neither work under it, nor should we be bound by its amenities. We unfortunately have considered ourselves so bound, with the result that we have entirely paralyzed our own hands and robbed ourselves of the ability either to level the scale-beam of justice, parry the blows of our opponents, set up fence for fence, or even to negotiate as business men and a business nation should do. Hence the state of our agricultural industries to-day. A state deplorable indeed, when we reflect that—but half a century ago—we were rearing, from our own land, the bulk of our requirements ; to-day we produce but about one quarter of that required to sustain us. Half a century ago we

grew wheat upon more than twice the extent of land we cultivate to-day; our annual contribution to the national granary, indeed, is now only equal to three months' supply in case of war. The decay, unhappily, still continues.*

All who would see our country o'erspread with healthily-designed and thriving industrial cities of the proposed *genre*, must keep in mind the fact that without compliance with the newer conditions and the passing of apposite enactments the inhabitants will not grow rich and contented out of the fields of waving corn to be seen upon their industrial girdles, for through these will run trains carrying the cereals of other climes.

* Our wheat crop last year was the smallest on record. The records go back for a period of 36 years, when there were more than three-and-a-half millions of acres under cultivation—to-day we have only 1,375,000. The Board of Trade has recently supplied returns showing the total and *per capita* value of agricultural products exported by the United Kingdom and certain Continental nations during a series of years. Some interesting changes, always unfavourable to ourselves, will be noticed in the following condensed table:

	VALUE PER HEAD.							
	1890		1895		1900		1903	
	s.	d.	s.	d.	s.	d.	s.	d.
United Kingdom ...	0	5½	0	5¼	0	4½	0	4½
France	4	3¼	2	3¼	2	9	3	3½
Germany	1	3	1	3	1	8¾	1	8½
Austria-Hungary ...	5	0¼	2	3	4	5	6	1¼
Italy	1	7¾	2	2¾	2	9¾	2	8½
Russia	5	7¼	5	1¼	4	9	7	4
Denmark	75	2¼	82	11	103	4¼	128	1¼

Neither, it might be added, if we still ignore the need for scientific training, will the vegetative band provide their inhabitants with a constant supply of home-grown vegetables, but, instead, the same trains will carry into the towns the products of the foreigner.

Our industrial supremacy has been encroached upon, and we are to-day suffering more deeply from our want of appreciation of the value of science applied to the arts than the average citizen has any conception of. A fusion of science with industry is a sore need with us, and Garden Cities might do much towards this end. For object-lessons we have but to look to the Continent. Many are the industries which, from this cause, have entirely fled our shores. 'Intellect and industry are never incompatible,' wrote Sharon Turner of old. 'There will be more benefit in combining them than scholars like to believe, or the common world imagine.' The day has arrived when an entire change in our attitude towards science should be made, and this applies equally to our treatment of inventors and pioneers in industry, which hitherto has been as suicidal as it has been senseless and unsympathetic — suicidal because it has driven genius and intelligence from our shores to enrich others and to create competitors from native brains.

But although the application of science to our industries, coupled with proper fiscal relations, could be made to work our salvation, yet the advocates for Garden Cities would do well to lend their aid

also to the law. There still stand upon the statute-book enactments which severely militate against the realization. Not alone imperial laws, but local bye-laws. 'In their laudable endeavours to provide comfort and safety, local authorities have laid down impossible rules and regulations, with the result that consequences the reverse of that hoped for have followed.'* Materials and construction less costly than bricks and brickwork have been used in the building of dwellings both hygienically and architecturally sound. By their means landowners have been enabled to provide the labourer with a spacious cottage and half an acre of land for half-a-crown a week. But such common-sense and efficient construction is condemned by our bye-laws, and the cost under them is made excessive—some £350 per cottage. So that the unfortunate labourer is forced to walk long distances and to huddle in tenement houses. 'These wretched and absurd bye-laws,' writes a land-owner thus debarred from providing his men and their wives with cheerful, healthy dwellings, 'are the curse of the country.'

One should not be without hope, moreover, that the building of Garden Cities may result in the improvement of our law of land tenure.

Reference cannot here be made to the repeal of laws and fresh enactments urgently needed for industrial betterment. In this relation, however, it is gratifying to observe the awaking at this moment

* *Law Times.*

taking place. But it should be pointed out that beyond such vital matters as work being wrenched from our workmen at starvation rates by aliens who neither seek nor appreciate the comforts all would wish to see our workmen enjoy, of their being further robbed of their employment by an unfair system of 'dumping,' there are other legal matters having for their object the placing of the workmen and manufacturers of our country upon an equal footing with others, and the alleviation of the disabilities under which we to-day suffer which should receive immediate attention.

Space prevents reference to these beyond drawing attention to one by way of example—a matter of great importance in our national industrial supremacy. There are those who appear to enjoy being 'old-fashioned,' but the 'old fashion,' unhappily, will no longer suffice us in the race for existence. Would we take an example of our old-fashioned modes, we have only to consider our system of weights and measures,* '*our antiquated and most irrational system*,' as it has been so well put. For, apart from the fact that the time now wasted in teaching our complicated and confused tables of weights and measures and compound arithmetic would be saved, and the time devoted to the acquisition of some useful knowledge, moreover, that thousands of

* All who have influence in forwarding the proposed legislation upon this subject, or who are interested in it, would do well to put themselves in communication with the Secretary of the Decimal Association, Oxford Court, Cannon Street, E.C.

pounds are wasted weekly in our offices in unnecessary calculations, we have the fact staring us in the face that our exports have suffered in a lamentable degree, and that loss from this source continues and increases. So far the warning statements contained in our consular reports have failed to awaken our 'old-fashioned' manufacturers; yet they have, time after time, been made in no measured terms. Here is a typical sample of British Consuls' statements: 'If the quotations and specifications in Trade Lists are made out in English Standards of Weights and Measures, intending purchasers here (Italy) generally throw them aside and consult others, which give the required information in metres, kilogrammes, etc.' Another Consul reports 'the non-adoption of the Metrical System acts most prejudicially against British manufactured goods.' Again, the report of an important Consulate runs: 'There is no doubt that the complicated and puzzling system of weights and measures still obtaining in England is long out of date, and has become more and more of an anachronism as Great Britain has increased her foreign trade.'

Happily, a change in the handicap may now be looked for; our more enlightened manufacturers are clamouring for such change, whilst the more far-sighted of our skilled workmen have long been fully convinced of the great necessity for a simpler and more reliable system of weights and measures, one which, being understandable by our foreign

customers, will tend to prevent the continued loss to us of valuable orders as the result of our complicated system.

I have mentioned this, as I have said, merely as a typical example of the sadly detrimental effect of our habit of *laissez faire* to which I have felt constrained to make reference. But the reader will at once call to mind other changes urgently necessary 'to set our house in order'—changes which will prove the more beneficial the less the procrastination in bringing them about.

This will mean work—arduous work and perseverance. Let the advocates for Garden Cities, and our patriots, gird on their armour to do battle with the problems; let them set out with the mind properly attuned, and ringing within it the truism thus expressed by Dickens—'If you entertain the supposition that any real success, in great things or in small, ever was or could be, ever will or can be, wrested from Fortune by fits and starts, leave that wrong idea here.'

I cannot, I feel, better conclude than by a reiteration of the bold and potent words of H.R.H. the Prince of Wales: for if Garden Cities are to be the success they might be, if their potentialities are to be realized to *national* benefit, 'England must wake up.'

In striving after social amelioration it must ever be borne in mind that this and industrial betterment can alone spring from commerce. See to it that the

conditions for wholesome trading are complied with, and thereby will be provided the sinews of war against social disabilities. For it is the incontrovertible fact, as an old writer put it, that 'by Commerce are acquired the two things which wise men accompt of all other things most necessary to the well-being of a Commonwealth: That is to say, a general Industry of the Mind and Hardiness of Body, which never fail to be accompanied with Honour and Plenty.'

END OF VOL. II.

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industry and lace-workers is an excellent study of one of the most interesting winter occupations of Switzerland. As to the story of the trip "Across the Great St. Bernard" itself, it is such as to hold the undivided attention of the reader, and shows that the experience, at all events, lacked nothing of excitement. The famous Hospice is described by Mr. Sennett with a sympathetic insight that is one of the best things in the whole book, whilst in the appendices the author gives proof, not only of his skill as an observer, but also of his scientific knowledge.'—*Automobile Club Journal.*

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'The sub-title of this volume indicates that it deals with "The Modes of Nature and the Manners of Man," and we shall not attempt to improve on this brief but exceedingly apt description of its contents. As regards its interest and its excellence, we may say that it is, in one respect, the very best guide-book to Switzerland that we have yet met with. Not, indeed, that it undertakes to tell the tourist how to get there and what to do when he gets there, or that it conveys any of the practical information to be found in Murray or Baedeker or Joanne. But it does a great deal more than that: it enables the reader to understand the country—not only to realize its varied scenery, but to understand the mystery of its mountains and of its glaciers, to become familiar with its inhabitants, and to picture the manner of their simple lives. Nor does the charm of the book lie in its bright and vivid descriptions alone. The author has brought photography to the aid of his pen, and has thus been able to add the attractiveness of something like 200 excellent illustrations to his interesting and instructive book—a book which we recommend as heartily to those for whom it will be a memorial of Switzerland as to those who will find in it the revelation of beauties and wonders they have not been privileged to behold.'—*Glasgow Herald.*

'In his prefatory note Mr. Sennett states that "it is usual to write something in the nature of a preface, also something by way of apology." It would be hard to quarrel with so modest an introduction as his. He hopes in some small measure to add to the pleasure "of those who love to roam mid mountain snows, make companionship with roaring torrents, and tread in sweet tranquillity the flower-enamelled zones of the glorious Alps, if not in fact, at least in fancy." Mr. Sennett writes with tremendous enthusiasm and versatility. His quick change of subject is further varied by the introduction of appropriate verses and apposite anecdotes. The beauties of Nature and the truths of science are blended with the happiest effect. This is further enhanced by the charming illustrations, for which too much could not be said. . . . In the valuable appendices, glaciers and their motion are dealt with in a "popular science" form which gives the views of the great students of such phenomena who have passed away. We have to acknowledge the author's compliment in accepting our advice in the matter of illustrations. . . . The scope of the present work is much wider than its predecessor, and it has eleven full-page plates and nearly two hundred smaller illustrations, all of which are interesting, and many exquisite.'—*The Northern Whig* (*Belfast*).

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'Mr. Sennett's passage of the St. Bernard is only an incident in a work which is mainly the outcome of geological research amongst the Swiss Alps; but the incident was a pleasant one. . . . This is but a portion of the volume, the rest being occupied with an examination into the orography and geology of the Alpine ranges, the building and conformation and erosion of mountains by volcanic or glacial action or by ceaseless torrent. The "chisel" of the glacier, no less than the river, has had much to do in modelling and sculpturing the rocky ruggedness of the "everlasting hills," here pulverizing gigantic boulders into fertile dust, or there depositing them in the form of "erratics," well known to the geologist. Mr. Sennett writes clearly and simply, and in a leisurely "old-fashioned" style, which in these days is particularly refreshing.'—*The Bookseller.*

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'We should hazard a guess, too, that the Author is in the happy position of the litterateur who can afford time to assimilate scenes, characters, history, and ideas before he sets them down on paper. For this is a book which we should prefer to read slowly and linger over, and take down from the shelf over and over again, and perhaps follow the flight of this gladsome, bird-like traveller on a good map. The ideal and the real, too, are so often and so happily blended that we almost dream of an undiscovered and land-locked Hesperides, where happy beings provoke the dream of an earthly Paradise. And perhaps the key to the riddle lies in the aptitude of Mr. Sennett to see all the good in men and things, while he leaves the evil to be looked after by other people. This is an ideal state of mind for the traveller, and still more for the author, and we can assure him that his joyous mood lends a subtle fascination to his work.

'Then, passing to abstract personalities, let us call attention to Chapter III., which we dare not spoil by quotation, where, in a graceful interlude on "Hotel Audiences," "Widows," "Girls' Physique," "Continental Gesticulation," "December Roses," "Women," "Conversation," and "Hotel Types," we satisfy ourselves that Mr. Sennett is no cynical recluse, but a *bon comarade* in the best sense of the term.

'And thus the kaleidoscope of life and scenery, ever changing, brings on the author's stage Rousseau, Voltaire, Madame de Staël, and Duke Charles of Burgundy, and others, a goodly company of those who have lived in history, and do live. In fact, the manners, as well as the moralities, are here depicted with a grim retrospect of times less joyous than those we live in, when fiends in human shape spent months and years in the perfecting of machinery for the mutilation and torture of their kind.

'And then, last of all, the author takes leave of us with a descriptive chapter on Monte Carlo—its natural and artificial beauties, its foul canker of the gaming-tables, and its cosmopolitan and floating population. And it would appear that the best panacea against the fever is to be a permanent resident in the smiling principality, for these alone are barred from staking on the roll of the ball. And yet we fear that though Mr. Sennett and a hundred others have done their best to scare the unwary and the fledgling from the net laid by the princely fowler, so long as the world lasts there will not be lacking those who are prepared to back a private system against a mathematical certainty. Throughout his book the author has led us through "sunshine and shower," and very aptly he leaves us where "flower and thorn" are so closely grafted as to be indistinguishable at sight.'—*Western Morning News.*

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